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USSR Report

CHEMISTRY

No. 103

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UDC: 541.128:543.27

USE OF THERMAL DESORPTION TO STUDY CATALYSTS OF LIQUID PHASE HYDROGENATION

Ivanovo IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA TEKHNOLOGIYA in Russian Vol 26, No 2, Feb 83
(manuscript received 1 Apr 81) pp 200-203

BATENIVA, Z. G., SOKOL'SKIY, D. V., ZHANABAYEV, B. Zh. and ASHIROV, A. M., Problems Laboratory, Kazakh Institute of Chemical Engineering

[Abstract] The method of thermal desorption described in this work was used to study catalysts after joint adsorption of liquid phase hydrogenation components - hydrogen, solvent, hydrogenated compound, reaction products. In the first stage irreversible adsorption of each reaction participant was studied separately in the presence of hydrogen. The catalyst was first saturated with hydrogen in a solvent then various quantities of unsaturated compound were added and the mixture was transfered to the thermal diffusion cell with a small quantity of solvent. The specimen was heated one hour in a furnace at 373K in a current of hydrogen to remove the solvent and reversibly adsorbed molecules. After cooling and exposure to inert gas, the specimen was heated to 973 K at 15.5°C/min. The desorbed gas was chromatographically studied. The experimental data thus produced yield information on the absorption occurring not only with activation of the catalyst and in the catalytic reaction, but also during training in the thermal diffusion cell. Figures 2; references 15: 14 Russian, 1 Western. [238-6508]

UDC: 547.944/945

DAURIN - A NEW ALKALOID FROM HAPLOPHYLLUM DAURICUM

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, Jan 83
(manuscript received 2 Jul 82) p 116

BESSONOVA, I. A., BATSUREN, D., ABDULLAYEV, N. D. and YUNUSOV, S. Yu.,
Order of Labor Red Banner Institute of Plant Substance Chemistry,
Uzbek SSR Academy of Sciences, Tashkent

[Abstract] Daurin an optically inactive base with mp 117-118°C was extracted in Mongolia from the total alkaloids of the roots of Haplophyllum dauricum (L.) G. Don by column chromatography. Daurin is soluble in alcohol and chloroform and crystallizes from acetone. IR and PMR spectral data are presented. Two possible structures are diagrammed. It is concluded that the actual structure is that of 4-methoxy-8-(γ,γ -dimethylallyloxy)-N-methyl-2-quinoline. References 3: 2 Russian, 1 Western.
[231-6508]

UDC: 547.944/945

ALKALOIDS OF VERATRUM LOBELIANUM, PART 9: 15-(1)-2-METHYLBUTYRYLGERMINE

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, Jan 83
(manuscript received 6 Jul 82) pp 118-119

NAKHATOV, I., SHAKIROV, R. and YUNUSOV, S. Yu., Order of Labor Red
Banner Institute of Plant Substance Chemistry, Uzbek SSR Academy of Sciences,
Tashkent

[Abstract] The above-ground portion of Veratrum lobelianum Bernh. collected in Alma-Ata Oblast near the end of the blossoming stage was found to contain 0.48% of a mixture of bases. Separation of the ether portion of the total alkaloids on a silica gel column with chloroform-methyl 9.5:0.5 eluent yielded a base with mp 224-226°C (benzene), $[\alpha]_D$-21.48° (pyridine) $C_{32}H_{51}NO_9$. Infrared spectral characteristics are noted. Alkaline hydrolysis

yielded an amino alcohol with mp 220-222°C identical to germine plus 2-methylbutyric acid. It is concluded that the alkaloid has the structure of 15-(1)-2-methylbutyrylgermine which had previously been produced synthetically but not found in plants. References 8: 3 Russian, 5 Western. [231-6508]

UDC: 541.8:541.123.3

LIQUID-LIQUID EQUILIBRIUM IN TRINARY DIMETHYLSULFOXIDE-CYCLOHEXANE (HEXANE)-ANILINE (o-TOLUIDINE) SYSTEMS

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA KHIMICHESKAYA in Russian No 2, Mar-Apr 83 (manuscript received 30 Sep 81) pp 30-32

TURSUNBAYEVA, A. T., ARISHEVA, N. S. and SERGEYEVA, V. F., Kazakh State University imeni S. M. Kirov, Alma-Ata

[Abstract] Results are presented from a study of the mutual solubility of DMSO-cyclohexane (hexane)-aniline (o-toluidine). The substances were carefully purified and dewatered before the studies were performed. The solubility isotherms have identical strip shape but differ in the values of heterogeneous areas: the greatest area of immiscibility is found in the DMSO-hexane-aniline system. In the DMSO-aniline (o-toluidine) system the components interact to form a hydrogen bond. The mutual solubility depends on the mutual solubility of the components in the associated binary systems and the intermolecular interaction in binary and trinary systems. Figures 2; references 14: 10 Russian, 4 Western. [236-6508]

UDC 615.281:547.241].036.8

ANTIMICROBE ACTIVITY OF CERTAIN DERIVATIVES OF PHOSPHINE AND PHENYLPHOSPHINE

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 17, No 3, Mar 83 (manuscript received 7 Sep 82) pp 313-318

MOLODYKH, Zh. V., ANISIMOVA, N. N., KUDRINA, M. A., LOSEVA, M. S., NIKONOV, G. N. and YERASTOV, O. A., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, USSR Academy of Sciences, Kazan

[Abstract] Noting that hydroxyalkyl and aminoalkyl organophosphorus substances offer high prospects for new antimicrobe compounds, the authors have studied derivatives of phenylphosphine and phosphine for surface and deep mycoses--with very selective sensitivity to chemical compounds--e.g., Trichophyton rubrum, T. mentagrophytes, Microsporum canis, Candida albicans, Escherichia coli and Staphylococcus aureus. Acyclic derivatives of alpha-hydroxyalkyl phenylphosphine were found to have relatively high fungicidal action compared to derivatives of 1,3,5-dioxaphosphorinanes for T. rubrum and M. canis. Other specific projected applications, chemical and biological tests are summarized. References 19 (Russian).
[232-12131]

UDC 615.281:547.288.3].015.2:[546.77+546.78+546.92].012.1

SYNTHESIS, PROPERTIES AND BIOLOGICAL ACTIVITY OF COMPLEX COMPOUNDS OF TRANSITIONAL METALS WITH FURALDAZINE

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 17, No 3, Mar 83 (manuscript received 28 Jul 82) pp 318-321

KORNIYENKO, G. K., MARYN, V. I. and SHEBALDOVA, A. D., Saratov University imeni N. G. Chernyshevskiy

[Abstract] The authors discuss synthesis of the title compound with Pt (II), Pd (II), W (V,O) and Mo (V) and their impact on its antitumor activity. Derivatographic analysis showed that the newly synthesized

compounds break down by complex, multistaged processes including splitting and decomposition of the organic ligand and decomposition of the inorganic part of the molecule. Antiphagic activity was studied in relation to NDA- and RNA-containing phages. Those with DNA were most sensitive to platinum- and carbonyl-containing tungsten complexes, which far exceeded the activity of the ligand alone. RNA-phagic activity was strongest in chloride complexes of tungsten and molybdenum, and the least activity was seen with palladium complexes. Chemical and biological details are summarized in experimental sections. References 9: 4 Russian, 5 Western. [232-12131]

UDC 543.544.658.012.011.56:681.3.06

MATHEMATICAL ASPECTS OF AUTOMATIC ANALYSIS OF CHROMATOGRAPHIC DATA

Moscow AVTOMATIZATSIYA I KONTROL'NO-IZMERITEL'NYYE PRIBORY V NEFTEPERERABATYVAYUSHCHEY I NEFTEKHIMICHESKOY PROMYSHLENNOSTI in Russian No 1, Jan 83 pp 10-15

ASHURBEYLI, R. D., Institute of Petrochemical Processes imeni Yu. G. Mamedaliyev, Azerbaijan SSR Academy of Sciences

[Abstract] A description is provided of the sequence of operations devised to attain computer-based analysis of chromatograms used in the evaluation of catalysts in petrochemical processes. A schema is presented for an eight-channel system covering all the elements of recording, transmission, manipulation, memory, reporting and storage. A simple algorithm for peak detection is based on the integral of a defined area which is determined each time a signal on the chromatogram increases, rather than from the angle of the slope of the rising part of the peak. The beginning of a peak is confirmed when the integral value exceeds a certain value designated by the operator. The system under description has shortened the time required for chromatogram analysis from 3 h to 45 min and is highly cost effective. Figures 4.
[207-12172]

PRODUCTION OF FUEL PRODUCTS BY THERMAL DISSOLUTION OF BENEFICIATED BALTIC FUEL SHALE

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 2, Mar-Apr 83
(manuscript received 12 May 81) pp 59-68

VOL'-EPSHTEYN, A. B., SHPIL'BERG, M. B. and GORLOV, Ye. G., Institute of Fossil Fuels

[Abstract] The possibility is demonstrated of increasing the yield of liquid products in thermal dissolution of beneficiated Baltic shale with subsequent coking of the slime by performance of thermal dissolution in the presence of octamethylcyclotetrasiloxane which is introduced to the paste at 0.1-0.15 mass %. The liquid products of thermal decomposition were coked in a metal-batch-still modeling the conditions of delayed coking of heavy petroleum products in unheated chambers. The process was stopped after the temperature in the reactor reached 500°C, by which time the liberation of liquid products and gas had significantly slowed. A high yield of crude gasoline and low-sulfur fuel oil (total 65-69%) and gas (10-12%) is achieved. Thermal shale dissolution, hydrogenation of the crude gasoline and separation of phenols for organic synthesis yield 17.2 mass % motor vehicle gasoline, 46.45% low sulfur shale oil, 0.7% C_7-C_8 monoatomic phenols, 1.5% diatomic water soluble phenols, 12.0% gases, 15.8% semicoke, 4.1% water, mechanical losses 2.8%, consumption of octamethylcyclotetrasiloxane 0.5%, hydrogen 0.25%, percentage of organic mass in all cases. Figure 1; references 14: 13 Russian, 1 Western.
[225-6508]

UDC: 662.642

INFLUENCE OF ADDITION OF MINERAL MATTER ON THERMAL DECOMPOSITION OF COAL

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 2, Mar-Apr 83
(manuscript received 29 May 81) pp 69-73

SMUTKINA, Z. S., SEKRIYERU, V. I., SKRIPCHENKO, G. B., OSIPOV, A. M. and KUZNETSOVA, L. V., Institute of Fossil Fuels

[Abstract] A study is made of the influence of a number of salts which are catalytically active under destructive hydrogenization conditions on the

nature of thermal decomposition of coal. Behavior of the coals studied during heating was evaluated from the temperature at which decompositon began and the temperature of total loss of volatiles, as well as the temperature of maximum mass loss rate and endoeffects on the DTA curve. The salts studied can be placed in the following sequence in terms of their influence on thermal decomposition rate: $PdCl_2 > Fe^{2+} > Ni^{2+} > Ni^{2+} > Mo^{6+} > SnCl_2 > > Fe^{3+} Mo^{6+} > Fe_2(SO_4)_3 > NiCl_2 >$ initial coal and coal plus $(NH_4)_6Mo_7O_{24} \cdot 6H_2$. All of the salts studied except nickel chloride and ammonium molybdate decreased the temperature at which decomposition of the coal begins by 20 to 100°C for hard coal, 10 to 60°C for brown coal. Figures 2; references 11: 9 Russian, 2 Western.
[225-6508]

UDC: 662.732

PROBLEM OF PERSPECTIVE PLASMA GASIFICATION OF LOW GRADE FUELS

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 2, Mar-Apr 83
(manuscript received 4 May 81) pp 88-90

KRUZHILIN, G. N., KHUDYAKOV, G. N. and TSELISHCHEV, P. A., State Scientific Research Institute of Power Engineering imeni G. M. Krzhizhanovskiy

[Abstract] Siberian coal plus low grade mineral fuels with high ash or sulfur content will make up an increasing share of the organic fuel burned by industry in the future. The most promising trend in the utilization of low grade fuel is preliminary processing of the fuel at the mining location to produce high calorie fuel containing no ash or sulfur. A low temperature plasma can be used to convert low grade fuels to high calorie methane or liquid hydrocarbon fuel purified of sulfur. As an example, calculated data are presented on the thermodynamic equilibrium of the products of oxygen gasification of kashpirian shale. Gasification produces synthesis gas ($CO+H_2$) with a heat of comsution of 7064 MJ/t of dry fuel. The physical heat of the gas and ash at 1200°C is 1685 MJ/t, total heat content of the components 8749 MJ/t, greater than the heat content of the initial fuel by 633 MJ/t. The irreversible energy loss required to produce this heat is 1125 MJ/t. Heat consumption to produce the oxygen is an additional 259 MJ/t. This means the loss of 14.6% of the initial fuel. Figures 2; references 4 (Russian).
[225-6508]

UDC: 552.57

GASIFICATION OF COAL AND HYDROGENIZATION SLIME IN WATER VAPOR PLASMA

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 2, Mar-Apr 83
(manuscript received 12 Jun 81) pp 91-96

KOLOBOVA, Ye. A., Institute of Fossil Fuels

[Abstract] Results are presented from studies of plasma gasification of various carbon-containing raw materials with water vapor. Thermodynamic calculations show that at temperatures over 1200 K practically the only components involved in the system are H_2 and CO. The two raw materials studied in this work differ quite significantly in yield of volatiles. Experiments were performed with a mean mass water vapor plasma jet temperature of about 3000 K. The gas produced had a high content of fuel components. The dynamics of gas formation over the length of the reaction zone were studied. The results indicate that processes of gasification and liberation of volatiles are completed over a distance of not over 1 diameter from the coal intake. Up to 95-97% of the fuel components are converted to gases. The composition of the initial raw material has little influence on the process of vapor gasification of the coking residue. Based on the experimental and calculated data obtained on the diffusion nature of the interaction of fuel carbon with water vapor, means can be noted to intensify the process in order to increase the degree of conversion of carbon to gaseous products, by increasing mass transfer of the gaseous reagent to the surface of the particles, by forced turbulization of the dust-gas flow by changing the direction of the flow, installation of various types of baffles, repeated circulation of the solid phase in the high temperature zone or, perhaps best of all, gasification with oppositely directed plasma jets. Figures 3; references 5 (Russian).
[225-6508]

UDC: 66.021.2:622.333:622.275

THERMODYNAMIC STUDY OF BEHAVIOR OF MINERAL COMPONENTS IN HIGH TEMPERATURE GASIFICATION OF EKIBASTUZ COAL

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 2, Mar-Apr 83
(manuscript received 29 May 81) pp 120-123

SAMUYLOVA, L. N. and SHPIRT, M. Ya., Institute of Fossil Fuels

[Abstract] Thermodynamic calculations were performed by means of a chemical thermodynamics program written in FORTRAN on a BESM-6 computer considering 114 components and 2 phases - the gas and condensed phases. Calculations were performed for the 1000-2500 K temperature interval at each 100 K for a pressure of 0.1013 MPa. The initial coal was Ekibastuz

basin coal, one of the most promising for the coal industry. Analysis of the calculated results shows that in 1000-1400 K temperature interval there is a decrease in the content of FeS, FeO, $CaSiO_3$, C, H_2O and an increase in the content of CaS, elementary iron, H_2S and CO. Possible reactions are noted. The results indicate that reduction of carbon by compounds of aluminum, silicon, iron, calcium and sulfur during high temperature coal gasification occurs if the initial C:O ratio is at least 1:1. The major products are silicon carbide, silicon monoxide and aluminum nitride. Where C:O<1:1, the mineral coal components are not reduced, but rather the silicon compounds are reduced by hydrogen at over 2200 K. The primary product is silicon monoxide. Figures 2; references 5: 3 Russian, 2 Western.
[225-6508]

UDC 542.95

SUPERCRITICAL DISSOLUTION OF KANSK-ACHINSK BASIN COALS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 268, No 5, Feb 83 (manuscript received 19 Feb 82) pp 1129-1131

GUBIN, S. P., KIRILETS, V. M., MEN'SHOV, V. I., RYZHKOV, Ye. M. and PLOPSKIY, Ye. Ya., Institute of Inorganic Chemistry, Siberian Branch of USSR Academy of Sciences, Novosibirsk

[Abstract] Tremendous coal reserves in Kansk-Achinsk Basin (KAB) located along the Transsiberian rail line could become a valuable resource of inexpensive energy, except for their low quality due to low heat productivity, high content of moisture and high content of CaO and other impurities. These coals can be almost completely dissolved in hot alkaline solvents. Therefore thermal dissolution of KAB coal was studied as one possible way of enriching them, using the so-called supercritical gas extraction method. When toluene is used at 400°C and 10 atms pressure, up to 35% of the combustible portion of the coal can be extracted in the vapor phase. After removal of the solvent, a dark oily liquid is obtained which could be substituted for standard fuel oil. Its combustion heat was 1000 Kcal/kg lower than that of the standard oil but other indices were comparable. Furthermore, this method was found to be applicable to other fuel sources. Peat and brown coal could be quantitatively extracted with alcohol under analogous conditions and converted to a produce resembling the fuel from KAB coal. Figure 1; references 3: 2 Russian, 1 Western.
[229-7813]

MINERAL FERTILIZER PRODUCTION ABOVE PLAN REPORTED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Mar 83 p 1

[Article by B. Trusov, director of Chernorechensk Production Association Korund imeni M. I. Kalinin, Dzerzhinsk, Gorky Oblast: "Together with Our Partners"]

[Text] The collection of Chernorechensk Production Association Korund imeni M. I. Kalinin decided to fulfill the 6 months' task in mineral fertilizer production by the beginning of the spring field work, 1.5 months ahead of schedule.

Having read this communication in the newspaper, some of the readers would probably want to ask: How can the plan be fulfilled at such an advanced rate? And someone may possibly think that we simply have an easy task that permits easy overfulfillment of the plan.

To counter any doubts in this regard, I shall cite the following facts. Our enterprise is one of the sector's largest in the volumes of mineral fertilizer production. It does not differ from most domestic plants in technical equipping. After all, our association began to organize production of Soviet mineral fertilizers as the country's first in the early 1930s. And essentially since that time it has been a type of academic test area for all enterprises that specialize in mass production of field "vitamins."

Of course, many changes have occurred over the decades in technology, but part of the old equipment is still being used. And of course it is in no way inferior to that which is being installed at modern enterprises of our profile. However, this does not prevent the association from increasing its product output every year.

We produce three types of fertilizer--urea, ammonia and sulfates--for agriculture. These are the most widespread types of top dressing of grain crops and vegetables. We delivered 20,000 tons of fertilizers above the plan to the countryside last year. And despite the fact that the plan for this year was increased so much that the collective of the association is seeking reserves to again significantly overfulfill the task.

What capabilities do we use to increase product output?

The specifics of enterprises of our profile is that the production equipment operates essentially without shutdown. It is switched off only for major overhaul. And then complexities with fulfillment of the plan begin. Most frequently the repair workers do not get the job done within normative deadlines and each hour of unscheduled idle time of the equipment means many tens of tons of unproduced product.

We have learned to avoid this. We repair any unit, mechanism or automatic lines usually in 1.5 to 2 hours faster than is established by the norms. Here, let us say, we will soon have to shut down the enormous so-called air-separating unit in the ammonia plant. The entire complex of complicated mechanisms must undergo major overhaul, but part of them will be replaced with new ones. According to the plan, this unit is supposed to stand idle for 3 months. But with shutdown of it, ammonia fertilizer production at the association is immediately cut in half. This means that one must struggle for each day so that the unit can be restarted as soon as possible. Our repair workers promise to give us an entire month. And this in turn gives the collective the opportunity to produce product above the plan.

But how do we manage to achieve such acceleration of repair? There is no secret. We were the first in the sector to introduce the scientifically based network schedule of major overhaul of shops, departments and of especially important facilities and units. The operations of each of the subdivisions of the association participating in repair work are clearly scheduled in it. All services of the enterprise know 1 year beforehand which facilities will be shut down for major overhaul and what must be done to reduce to a minimum the time required for overhaul.

The aim of the repair workers toward a sharp reduction of deadlines is stipulated in a special order throughout the association. There incentives are stimulated in this case by the regulation on the material reward to each who distinguishes himself in repair work. We add a 40 percent bonus to wages for putting renovated production equipment into operation ahead of schedule.

Of course, this is not only a matter of a bonus, although one cannot discount it. Broad horizons for initiative and creativity have been opened up among our people. At the suggestion of the repair workers, we began to make almost all the spare parts for the equipment in our own shops. The expenditures are repaid with interest since the units are idle in repair much less than the established deadline.

But this is only one aspect of the matter. There is another. It is related directly to product output. Nowhere else is it as important to observe the strict technological mode of equipment operation through the entire chain. Deviations immediately have a negative effect on fulfillment of the plan. Everything depends on people here. For example, the collective for ammonia production at the plant numbers one-half fewer than established by the project, but the work has been organized clearly and without interruptions. And all because such masters of their affairs as G. Chuzhaykin, V. Kornilov, V. Bondin, V. Kashin and others, who have perfected three or four related occupations, are working there. And generally complete interchangeability has

been established in this collective since everyone without exception has the highest qualifications. Hence, a high degree of conscientiousness and honesty are the basis of reliable order and discipline.

And still events suggest that whereas the enterprise now places its bets only on the enthusiasm of people, it may be among the lagging enterprises tomorrow. Therefore, we are constantly strengthening the efforts of the collective with active introduction of new equipment. A special washing column of unique design recently began to be used for the first time in the sector for purification and utilization of fertilizers. It made it possible to increase urea output by 25 percent. Many of these examples can be cited, but I will not begin to enumerate them. And the essence of matters is not quantitative, but in the yield which innovations bring--both at each work site and in the association as a whole. It is no accident that our labor productivity is considerably higher than the average throughout the sector.

But the product has been manufactured. One must now see that it is dispatched on time to the customer. Packing and rail cars are required for this. Moreover, previously we frequently had deficiencies in this phase. Let us say there is packing but no rail cars. Or on the contrary, there are rail cars but there is nothing to ship the freight in. Our entire product is now dispatched clearly on schedule and even ahead of schedule. What has changed?

A large amount of urea once accumulated near the tracks at our plant. Rail cars stood alongside but we were unable to load them--there were no bags. And now by agreement with the railway workers and customers, we have become the country's first to load urea into rail cars in bulk, that is, by the unpackaged method. This made it possible to free 32 persons from loading-unloading operations. There is no need for scarce paper bags, of which approximately 5 million per year were formerly needed.

One could contradict me and say that rail cars are needed as before, but the railroad workers are not distinguishing themselves with observance of the delivery schedule. But we have removed this problem from everyday occurrence. Rail cars, many of which we previously refused to load because of their malfunctioning state, were usually delivered to the sidings. We now do not return a single rail car to the railroad workers. A complex brigade, headed by experienced specialist A. Kravets, has now been created for repair of them. Tank cars, gondolas, containers and boxcars are repaired on a 24-hour basis. Up to 25-30 rail cars now are given a second life daily at our plant. Last year we expended 250,000 rubles on this. At first glance, this is a high figure, but these expenditures are repaid. Last year we were able to ship almost 5,000-10,000 tons of product above the plan. More than half of the product was mineral fertilizers.

Many enterprises have now taken on themselves rail car repair. We ascertained in practice that this is a necessary matter. But this is how the problem arises. For some reason no funds are allocated to the enterprises for materials for rail car repair. And, let us say, our association has taken on this year alone the repair of more than 6,000 rail cars. Both metal, lumber and many other things are required for this. We would like USSR Gosplan

to include them in the funds for those industrial enterprises which are repairing rail cars through their own efforts. Otherwise these materials will have to be acquired by devious paths and as a result a loss will be inflicted on state interests.

I have talked about those capabilities which permit us to achieve a significant increase in the volumes of mineral fertilizer output. Any enterprise has these reserves. Comrade Yu. V. Andropov said very precisely at the November (1982) Plenary session of the CPSU Central Committee: "Conditions must be created--economic and organizational, which would stimulate high-quality and productive labor, initiative and enterprise." Because of creation of just these conditions, our collective of many thousand has pledged to complete the task for this year and for the five-year as a whole ahead of schedule.

6521
CSO: 1841/187

SULFURIC ACID PRODUCTION EQUIPMENT INSTALLED AHEAD OF SCHEDULE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Mar 83 p 4

[Article "Builders Made Up For Omissions"]

[Text] Installation of sulfuric acid production equipment at the Novokokand Chemical Plant, now under construction, was completed ahead of schedule. It can produce 500,000 tons per year.

This construction was behind schedule as recently as 1½ years ago. Trust No. 14, one of the low-capacity contract organizations, did not have the means or funds to perform a large volume of work. In order to correct the situation, the Ministry of Construction of the republic concentrated all subdivisions of the trust on the major starting project and provided considerable economic assistance. Sub-contractors did the same. As a result, the construction program for this past year was ahead of schedule.

TASS correspondent reports that the plant builders and assemblers have assumed increased obligations this year. They pledge to have the sulfuric acid unit in operation one quarter ahead of schedule. Equipment suppliers supported this initiative. The plant construction is proceeding at shock-worker tempos.

2791
CSO: 1841/219

CHERKASSY INDUSTRIAL ASSOCIATION 'AZOT' WINS MARK OF QUALITY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Mar 83 p 1

[Article by Correspondent Zh. Tkachenko "Quality Service"]

/Text/ Three-fourths of the chemical output of Cherkassy Production Association "Azot" carries the state Mark of Quality. The association's product-mix is rather extensive, including ammonia and ammonia water, saltpeter, carbamide, ion-exchange resins and complex liquid fertilizers.

Competition to increase production output by the beginning of field preparations is proceeding enthusiastically. Only Cherkassy carbamide received the Mark of Quality. Each procedure at the enterprise is strictly monitored and important work is being carried out with customers.

Quality service has close business contacts with consumers and studies the effectiveness of fertilizers produced on different farm crops and soils. The enterprise collection considers quality production to be the most important of all production parameters.

2791
CSO: 1841/219

INCREASES IN FERTILIZER PRODUCTION

Kiev PRAVDA UKRAINY in Russian 29 Mar 83 p 1

[Article by A. Maslov, "For the Spring Field"]

/Text/ The rates of delivery of mineral fertilizers to agriculture are increasing annually. Fertilizer production in the country has tripled over the last 15 years and output of fertilizers for the Food Program will reach up to 30 million tons per year by 1990. Chemists of the Ukraine are making an important contribution to this achievement.

ROVNO. The "Azot" association is providing more than 28,000 tons of mineral fertilizers above their quota to the agroindustrial complex. All of the above-plan fertilizers are of excellent quzlity and carry the star of honor.

The creative use of the Shchekino experience made it possible to increase labor productivity greatly and to reduce the number of personnel involved in basic production processes. The complex system of social and economic control of labor productivity, developed by association specialists, was also quite important. It is recommended for all enterprises of the sector.

The other day the enterprise produced an experimental batch of mineral-fertilizers mixtures with prescribed ratios of nutrients, including nitrogen, phosphorus and potassium. Such mixtures will be prepared upon order according to the soil properties of specific fields. This use of fertilizers will help the farms considerably. A special assembly has been prepared to mix these mineral fertilizers.

SUMY. Using all of its resources, the collective of the Sumy Production Association "Khimprom" ensured output of 13,400 tons of mineral fertilizers above their quota, for spring plantings. Most of this production was ammophos and complex liquid fertilizers. They also produced nearly 450 tons of fodder phosphates, a product which is used in animal husbandry as a valuable mineral additive. Foreman V.F. Chauk's shift and foreman V.L. Denisenko"s crews have the best production figures in the collective.

The slogan of leading Moscow enterprises "Honor and Glory in Labor" is widely disseminated in the association. Brigade forms of organization of and payment for labor contribute greatly to the realization of this slogan. The collective's

morale has improved greatly and the quality of output has increased. Mineral fertilizers output increased by 22 percent in comparison with production for the same period last year.

However, we think the association could be much more productive if there were no interruptions in apatite deliveries and if enough railway cars for hauling finished production were available.

STEBNIK. While the potassium plant collective was unable to meet its quota last year, it is now making rapid improvements. Kolkhozes in L'vov Oblast alone received 12,000 tons of potassium-magnesium concentrate and half of this was above-plan production.

How do you explain such an unexpected spurt? We asked V.I. Pyrig, deputy director of the enterprise, this question.

He explained that the railroad began to fulfill its contract responsibilities strictly to the letter. Moreover, 3 or 4 extra railway cars were provided each day. This made it possible to fulfill the quarter's quota 6 days early. If our subcontractors maintain the same tempo in the future, we shall complete the annual plan ahead of schedule. For our part, we are helping the railroad men as much as possible; our repair workers work on 7 or 8 railway cars daily. We did this before, but in a much lesser volume. The use of the experience of the Moscow workers in repairing rolling stock by the use of their own industrial enterprises is proving to be quite helpful.

The enterprise itself began to operate most intensely. Among the leaders at the latest summing up of socialist competition were T.N. Sidorik's crew, M.M. Shuben's crew and N.Ya. Basov's crew and the cleaning section of mine No. 2, headed by P.A. Grishutin.

* * *

The situation with respect to delivery of mineral fertilizers is still as difficult as it was before at the Crimean association "Titan." Since the beginning of the year, 800,000 rubles have been lost here on ammophos production. It is very disturbing that one of the largest shops of this enterprise, with a capacity equal to that of a plant and with modern equipment, stood idle for 10 days in less than 3 full months. This equals the time lost in the entire past Five-Year Plan. We must take into account the fact that the well-organized experienced collective of the ammophos shop has the capacity to exceed the assigned quota by a large margin.

"Not only is it a pity that the capacities are 'not being used,' it is shameful to look people in the face" says N. Borisovskiy, secretary of the Party Committee. "We appealed to our raw material supplier, the 'Apatit' (Kirovsk in Murmansk Oblast) many times but things are unchanged. In these days, we must stretch the available supplies. Our partner's attitude to the problem of ensuring supplies does not help matters."

2791
CSO: 1841/219

PIPELINE DELIVERY OF FERTILIZERS

Moscow SEL'SKAYA ZHIZN' in Russian 12 Dec 82 p 3

[Article by V. Bogdanov, correspondent of the oblast newspaper VOLZHSKAYA KOMMUNA and P. Grigorenko, SEL'SKAYA ZHIZN, "After Delays - Haste"]

/Text/ A large tract, upon which vast spherical containers and 75-meter columns are intertwined with pipelines and complicated structures, is being opened to the right of the Kuybyshev--Tol'yatti line. It is a fertility combine, the "Tol'yatti-azot" association. The scales of the enterprise are truly gigantic. Even today, five "Ammiak" units for 450,000 tons a year and two "Karbamid" units for 900,000 tons of fertilizer a year are producing for the fields of the country. One other "Ammiak" unit is in the stage of start-up and adjustment with plans for it to begin production this year. In essence, each unit is a major mineral fertilizers plant.

The association ships a large part of its production to farms in the RSFSR and to the Ukraine through an underground pipeline, the Tol'yatti--Odessa ammonia pipeline, which is almost 2,500 kilometers long. The fertility route has been in operation since December of last year. Already, 2.5 million tons of liquid ammonia have been pumped through the pipeline. There are dozens of delivery stations along the pipeline and the fertilizer is transported from these to kolkhozes and sovkhozes by special transportation. This entire complex operation is controlled by automatic equipment with the control desk located in Tol'yatti. The gigantic underground river and all of the technological equipment are in the hands of five operators.

The USSR Ministry of Energy collective "Kuybyshev gidrostroya" and the USSR Ministry of Installation and Special Construction Work Middle-Volga administration "Prommontazh" are building the chemical complex. Builders, installers and operators, using the advantage of a team contract, are competing to reduce the time required to build the fertility combine. Still, the situation found at the construction site is a cause for concern. "Ammiak-6" should be in operation in December. Managers of the association chief engineer V. Istratov, acting deputy director of capital construction V. Vinogradov, deputy director for production M. Nikonov and main contract chairman N. Bessmertnyy declare in a single voice: the sixth unit will be in operation by the end of December.

The convincing tone of their words is reassuring but a long list of conditions and unfinished work cast doubt upon the accuracy of such a statement. These are only some of the problems to be faced. Before liquid ammonia from the sixth unit can flow into the underground pipeline, the builders must perform almost one-half of all start-up and adjustment operations, involving 140 out of 309 projects. They have not started them yet. Among the very important sections of the vast production, the shipping shop and the purification installations are not even ready for delivery. There are delays in finishing operations and in anticorrosion coating of the equipment. The many flaws in workmanship in the steam and heat supply system and in the fire department are being eliminated hastily. Installa- of ventilation equipment is being delayed because the equipment was defective when it arrived at the project. Adjustments of the central control panel are being delayed because heat is unavailable there. The list of flaws in workmanship could be continued. The situation is complicated by the fact that the designers are constantly changing the design and revising the estimate. By the way, the expenditures provided for it were exceeded long ago. In a word, the builders and assemblers of the sixth unit still cannot begin the start-up schedule. The client is also liable because he could not manage to supply, in time, technological and auxiliary equipment, including equipment for producing 2 million tons of carbon dioxide.

If you judge by the time limits, the premises containing the complex equipment should now be on a pre-start-up regime. Meanwhile, the end of the builders' and assemblers' worries is nowhere in sight at many sections of work. All hands' jobs and rush work prevail. Nervousness and bustle accompany the haste. In one of the shops, we heard an assembler say "more haste, less speed." It could not be said more exactly. Even if the project is put into operation, there is practically no one to operate it. The shortage of technical personnel is evident already. The association management decided to engage persons from subdivisions of the Ministry of Installation and Special Construction Work in the start-up and adjustment period. There is no doubt that the neighbors are helping. But what can be done when they return to their own jobs?

At the time when only 2 weeks remained before start-up of the sixth aggregate, there were frequent calls to mobilize forces and to redouble the work tempo. If words fail appeals might help. It is annoying to realize that they are being heard only after long delays and time wasted because of lace of organization.

The builders and operators face a difficult task. How they perform will determine the increase of new capacities for producing mineral fertilizers and the size of the contribution of chemists to the food program.

2791
CSO: 1841/219

LIQUID AMMONIA PRODUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Feb 83 p 1

[Article by A. Dmitriyev: "Sixth Unit Started Up"]

[Text] The first product has been produced on the first unit for liquid ammonia production at the association Tol'yattiazot. This installation will produce 450,000 tons of fertilizers per year. After bringing this unit to operating capacity, the total output of the complex at Togliatti will reach 2.7 million tons of ammonia and 900,000 tons of urea annually.

The operators have pledged to bring the new unit to design capacity 3 months ahead of schedule.

6521
CSO: 1841/187

INCREASE OF UREA PRODUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Feb 83 p 1

[Article by V. Ukolov, special correspondent, Berezniki, Perm Oblast: "They Kept Their Word"]

[Text] The year had hardly begun and the chemical workers of the Berezniki Association Azot had already fulfilled the first item of their annual socialist pledges--they brought the urea shop up to design capacity 2 months ahead of schedule. This made it possible to produce an additional 7,000 tons of mineral fertilizers for the needs of agriculture.

The labor has been clearly organized in the shops and the production equipment is being repaired on time and in a qualified manner.

6521
CSO: 1841/187

MANAGERS REPLY TO CRITICISM OF MINERAL FERTILIZER PRODUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Mar 83 p 3

[Article "Where Is The Lost Million" (passages rendered in all capital letters printed in boldface in source)]

/Text/ On 15 December, "Socialist Industry" used this same headline for a story describing an inspection of mineral fertilizer production enterprises by our supernumerary reporters. The inspection was carried out because the sector did not fulfill the 1982 plan and "owed" agriculture more than 1½ million tons of "fertility vitamins."

The inspection showed that the losses of mineral fertilizers begin in the shops because of unskillful use of equipment, lack of timely equipment repair, incomplete use of capacities and several other causes.

The editorial board received a reply from managers of the enterprises and ministries involved. Specifically, A. OSEYKIN, DIRECTOR OF THE KONSTANTINOVSKIY CHEMICAL PLANT 25th CPSU CONGRESS writes: "The article 'Where Is The Lost Million' was discussed at engineering and technical personnel meetings and at workers' meetings in shops producing ordinary and granulated superphosphate. The problems noted in the article were discussed. Faulty pouring devices produced spills of granulated superphosphate on the finished production tunnel. Minor repairs were performed and spilled output was placed in the warehouse. Yu. Yesin, shop director, was given an administrative fine.

"In the ordinary superphosphate shop, there was an above-norm supply of output which hindered its complete processing and affected the quality of the mineral fertilizers. The required amount of rolling stock is now ensured by order of the Ministry of Railroads and by decisions of operational All-Union selector conferences. The surplus superphosphate is being removed from the warehouse and will be at a normal level in the near future." We must mention that the editorial board received this reply in the middle of January.

V. RYABOV, MEMBER OF THE BOARD OF THE USSR MINISTRY OF THE PETROLEUM REFINING AND PETROCHEMICAL INDUSTRY, reported that "the state of affairs regarding mineral fertilizers output and the completion of major repairs at the 'Aalavatnefteorgsintez' was examined by a traveling commision of the USSR Ministry of the Petroleum Industry.

The commission noted the unsatisfactory technical condition of the equipment due to prolonged operation at high temperature in a corrosive environment and the delay in performing needed capital repairs and intermediate overhauls.

The commission helped in working out measures to ensure stable output of mineral fertilizers and to compile a schedule of capital repairs of the equipment. Measures were taken to concentrate the efforts of the 'Salavatneftekhimremstroy', in 1983, on repairs of mineral fertilizers production projects. Important jobs will be completed from January to July".

The editorial board also received a reply from B. KOLOMAZOV, DEPUTY MINISTER FOR MINERAL FERTILIZERS PRODUCTION. His reply describes energetic measures being taken to make up for delays at the Rustavi Chemical Plant. The All-Union Association "Soyuzazot" held a meeting of an enlarged council of directors at the enterprise. Each shop and production process was given support by more efficient enterprises. The "Kuybyshevazot" association became the patron of caprolactam production, for example, while the "Orgminudobreniya" trust helped the electrolytic magnesium dioxide shop. The patrons help the lagging plant by providing qualified personnel and also materially. As a result, the Rustavi Chemical Plant fulfilled the plan for mineral fertilizers production for the first time in many years, in February.

At Dorogobuzh Nitrogen Fertilizers Plant, the nitric acid unit underwent major repairs, additional equipment was installed and other organizational and technical measures were carried out. All of this helped the collective to overfulfill the February plan.

Measures are being taken to make up for lost production at other enterprises of the sector. The ministry established daily checks of the delivery of mineral fertilizers to agriculture.

B. Kolomazov also reported that problems involving shipment of mineral fertilizers for the 1983 harvest are being considered jointly with the Ministry of Railroads. Repair of railway cars is being carried out at practically all enterprises of the sector in order to help the railwaymen.

In January and February, chemists of the country met the quota and overfulfilled the mineral fertilizers plan by 134,000 tons of mineral fertilizer.

V. GIN'KO, DEPUTY MINISTER OF RAILROADS, described the mutual understanding of the ministries involved in this matter: "At present, loading of chemical and mineral fertilizers by the railroad network is proceeding at 99.9 percent. Most enterprises of the sector, including Grodno and Novomoskovsk "Azot", Voskresensk "Minudobreniye", the Moscow region industrial association "Fosfat", the Sudogda quarry administration, the Konstantinovsk Chemical Plant, the Karatau" association are making railway shipments completely according to plan.

Actually, delivery of freight cars to the chemists did increase in January and February of this year in comparison with the number delivered last year; there was an increase of 921 cars. HOWEVER, THIS IS NOT ENOUGH FREIGHT CARS TO DELIVER ALL OF THE FERTILIZERS PRODUCED. IN FEBRUARY ALONE, COMRADE GIN'KO RECALLED, THE GRODNO ASSOCIATION "AZOT" RECEIVED FEWER THAN 104 FREIGHT CARS. THERE ARE 50,000 TONS OF DIFFERENT KINDS OF FERTILIZERS LAYING AT ENTERPRISES. THE MOSCOW REGION ADVANCE YARD "FOSFAT", WHICH WAS MENTIONED IN THE REPLY AS AN EXAMPLE OF IDEAL SUPPLY OF EMPTIES, DID NOT RECEIVE 310 FREIGHT CARS LAST MONTH. THERE WERE 10,000 TONS OF FINISHED PRODUCTION IN THE WAREHOUSE AND ONE OF THE BASIC PRODUCTION PROCEDURES WAS SHUT DOWN. THE BEREZNYAKOVSKIY NITROGEN-FERTILIZER PLANT DID NOT RECEIVE, IN FEBRUARY, THE 220 FREIGHT CARS ALLOTED BY THE PLAN. NOW THEIR WAREHOUSES CONTAIN NEARLY 20,000 TONS OF MINERAL FERTILIZERS.

THE SHIPMENT SITUATION IN THE INDUSTRIAL ASSOCIATION "URALKALIY" IS ESPECIALLY POOR. THE WAREHOUSES NOW HOLD 225,00 TONS OF MINERAL FERTILIZERS BECAUSE THE ENTERPRISE DID NOT RECEIVE 1,267 FERIGHT CARS.

AT A CONFERENCE OF REPRESENTATIVES OF THE MINISTRY OF RAILROADS AND SECTORAL MINISTRIES, AN INCREASED VOLUME OF SHIPMENTS WAS DETERMINED AND INCORPORATED INTO THE BASIC PLAN. THIS ADDITIONAL VOLUME EQUALLED 240 WAGONS A DAY FOR ENTERPRISES OF THE MINISTRY OF MINERAL FERTILIZER PRODUCTION. ACTUALLY ONLY SIX IS BEING ALLOTED.

And spring has arrived already.

2791
CSO: 1841/219

UDC: 546.185+661.635

DISSOLUTION KINETICS OF COMPLEX NP AND NPK-FERTILIZERS BASED ON CALCIUM POLYPHOSPHATES

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA KHIMICHESKAYA in Russian No 2, Mar-Apr 83 (manuscript received 22 Apr 81) pp 1-4

KOROTEYEVA, N. Ya., URIKH, V. A. and BEKTUROV, A. B., Order of Labor Red Banner Institute of Chemical Sciences, Kazakh Academy of Sciences, Alma-Ata

[Abstract] A study is made of the kinetics of the process of dissolution of calcium polyphosphates in complex fertilizers. The study was performed by a kinetic method at 15, 25 and 35°C in two versions. In the first, a vitreous calcium polyphosphate $Ca(PO_3)_2$ in powdered form was added to a prepared solution of the nitrogen and potassium components of P or PK fertilizer. In the second granulated NP and NPK fertilizers formed by combined granulation of the nitrogen and potassium components with powdered fused calcium polyphosphate were dissolved. It is concluded that polyphosphates should be used not as an individual compound but rather as part of combined fertilizers. Combined fertilizers also have greater agrochemical effectiveness than individual component fertilizers. Figures 4; references 7: 5 Russian, 2 Western.
[236-6508]

LACK OF COMMERCIAL SALT CRITICIZED

Moscow IZVESTIYA in Russian 2 Feb 83 p 1

[Article by engineer M. Yegorov: "The Question is Where is the Salt"]

[Text] The kolkhozes and sovkhozes, enterprises of the food sectors of industry, district heating plants and the country's chemical enterprises had a shortfall of thousands of tons of commercial salt at the beginning of the year. Because of this, the feed ration of animals has become worse, the district heating plants are burning excess coal and the work of the chemical plants has become more difficult. Alarming telegrams are coming in unceasingly from Siberia and Kazakhstan, Arkhangelsk and Krasnodar to the managers of USSR Gossnab and Minudobreniy [Ministry of the Fertilizer Industry]. Their meaning is identical: "Send us salt!"

But there is no salt. The collectives of the Beloruskaliy and Uralkaliy Associations and of the Baskunchak salt industry are systematically interrupting the delivery plans. Why? Have they forgotten how to operate?

No. They are simply unable to deliver the finished product. The Sverdlovsk and Belorussian Railroads have for a number of years been scheduling delivery of rail cars to potassium suppliers, cars which can only ship half of what is produced.

Here is a clear example--one of many. In January the Uralkaliy Association was supposed to ship 107,000 tons of commercial salt and ordered 1,527 rail cars. The Ministry of Railways confirmed a limit for 842 rail cars. However, the association received only 675 cars and therefore managed to ship only 44,000 tons of product to the suppliers. This type of "scheduling" on the whole resulted in the fact that the debt of the potassium suppliers has increased to 160,000 tons of salt since the beginning of the year. The schedules of both the supplier enterprises and the consumers are going by the wayside. And what about the railroad workers?

It seems that they are even overfulfilling the plans for salt shipments! A curious document, signed by the deputy minister of railways V. N. Butko, came in to USSR Gossnab a few days ago. It contained information that the plan for salt delivery had been overfulfilled by 131.2 percent for the Uralkaliy Production Association in January and that it is being successfully fulfilled in February as well.

Unfortunately, such victorious "relations" cost a lot. Arbitrary scheduling of salt shipments without regard to the delivery plan may yield the necessary accounting figures. But this does not guarantee the main thing: meeting the needs of the consumers.

6521
CSO: 1841/187

FEED ANTIBIOTICS AS BIOLOGICAL STIMULATORS OF ANIMAL GROWTH

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 23 Feb 83 p 2

[Article by Ye. Leont'yeva: "How to Raise a Giant"]

[Text] This was a dinner-party and the refreshments were abundant. The guests could dine on chicken-tabaka, all types of veal, beef and pork chops, broiled and baked turkey, duck and other poultry. Cooks of the highest qualifications prepared all these viands. And only they knew the secret of the dishes.

It must be stipulated immediately that the dinner was a tasting type. The invited guests--specialists in the field of food hygiene, medicine, veterinary science and microbiology--were supposed to give their opinion on the taste qualities of each of the meat dishes. Later, when all the "twos" and "fives" and all the "pros" and "cons" were laid out, it was determined that the dishes prepared from the meat of animals and poultry to whose ration feed antibiotics were added received the greatest number of votes. As it turned out, this meat is distinguished by a delicate aroma, is easily processed, looks very appetizing in prepared form and, which is most important, has high nutritional properties.

How does one explain this? Feed antibiotics, entering the animal organism with the food, stimulate the activity of the gastrointestinal tract and contribute to better assimilation of nutrients. All this is reflected in the quality of the meat.

Adding feed antibiotics to the food of animals in the form of biological stimulators was begun quite recently. Special nonmedicinal antibiotics in negligible amounts--from 0.5 to 20 grams--are required per ton of feed products. And the result is rather significant. When feed grisein, let us say, is added to the feed, the animals gain weight by more than 15 percent compared to the ordinary ration. Calculated per kilogram of chemically pure substance, the use of antibiotics in animal husbandry yields a saving of up to 185,000 rubles.

The use increases sevenfold the egg laying of poultry. The fertility of swine, sheep and fur-bearing animals is increased by almost 20 percent. Scientists recently tested these preparations on fish. Carp and sturgeon fry increased their weight by 75 percent during the experimental year!

Several years ago, our industry produced no more than 200 tons of these preparations annually. And this was a surplus for agriculture: they simply did not know how to treat their miraculous properties and were mistrustful of them.

Now, when production has increased sixfold, there is an acute shortage of these substances. The USSR Ministry of Agriculture has ordered 4,513 tons for 1983 and industry promises to deliver only 1,800 tons.

This can be explained to a significant degree by the fact that the production of antibiotics for animal husbandry was organized comparatively recently in our country. The fact is that a subsector has been developed during the past 15 years which has emerged in first place in Europe in product output. It grew on the basis of alcohol plants. The characteristic nature is that these enterprises did not have sufficiently strong energy facilities required to produce these preparations, but nevertheless they coped with the new load.

The first biological stimulator was biovite--a biological vitamin. Since then, scientists of the Laboratory of Antibiotics of VNIIbakpreparat [All-Union Scientific Research Institute of Bacterial Preparations] has developed 10 new ones and four of them have been introduced. However, the existing capacities did not permit an increase in the output of these preparations in the necessary volumes. A new technical base had to be developed for the subsector.

Timely highly efficient production of feed antibiotics is possible only when special equipment--turbocompressors and fermentation vats with mixers, which in turn require a stronger energy supply--is installed at the plants. Chemical machine building is delivering the necessary equipment in the necessary quantities to enterprises of Glavmikrobioprom [not further identified]. For example, approximately 20 turbocompressors have been accumulated at the Talitsa Biochemical Plant. But in order to install them, a new electric power transmission line must either be installed or a substation must be constructed. The enterprise is supposed to do all this at its own expense.

The path of least resistance is taken at most plants if there is a lack of funds--they simplify the design of the fermentation vats. They proceeded this way at the Nemeshayevo, Novograd-Volynskiy and the Verkhnekhortitsa plants of Glavmikrobioprom. As a result, there is of course a shortage of available energy capacities but first, part of the equipment is idled and second, one-third of it operates at idle after this modification. In this case the losses of such antibiotics as mixed feed grisein, bacitracine and talazine comprise up to 20 percent due to obsolete design of vacuum evaporators. But now, based on the requirements of the Ministry of Agriculture, the output of biological stimulators should increase severalfold during the next few years! The present situation is hardly possible with today's status of production.

It was especially emphasized at the November (1982) Plenary Session of the CPSU Central Committee that fulfillment of the Food Program cannot be postponed. The production of nonmedical antibiotics directly "works" toward fulfillment of the plans provided by this program. Therefore, there is an acute

need to resolve the problem of how to further increase their volume: whether to install supplementary, but low-performance equipment or to urgently begin modification of enterprises and fundamental technical re-equipping of them on a modern basis. The former path, as we have already ascertained, is unprofitable.

There is experience toward which one can bravely orient oneself. A Soviet strain is being used at the biochemical plant at Pester in Bulgaria. But turbocompressors and valuable fermentation tanks are operating there and high-quality raw material is being used. As a result, two times more of the preparation is being produced in Bulgaria on the basis of our Soviet strain than in the Soviet Union. But the Bulgarian strain yields almost one-third as much product as proposed under conditions of the Ungeny Biochemical Plant.

Specialists have calculated that the volume of production could be doubled by 1985 by intensification and technical re-equipping. True, capital investments of 43 million rubles would be required. This is not much money. But after all, the national economic effect will comprise approximately 7 billion rubles by the additionally produced product. One ruble of expenditures will bring in 152 rubles of profit!

Thus, the logic of economic calculations indicates that reconstruction of enterprises that produce antibiotics for animal husbandry is necessary and justified. However, the viewpoint among managers of the VPO [All-Union production association] Soyuzbakpreparat is somewhat different. The chief of the association A. Yudin and the chief engineer V. Udovchenko, for example, feel that it is now disadvantageous to become involved in reconstruction of these enterprises.

This viewpoint would be justified if the problem was one of capital investments. But the matter is quite different here. The deputy chief of the Department of Microbiological and Mixed Feed Industry of USSR Gosplan G. Yegorov reported that as much money has been allocated for development of the sector as would be required by the five-year plan and that reconstruction in this subsector now is a question of primary importance. It cannot be stated more clearly!

The lag of the industry that produces antibiotics for agriculture is also explained by the fact that essentially one small laboratory numbering 24 persons is engaged in this extensive and promising science and only three of them are involved in problems of preliminary analysis of preparations in agriculture. It may seem strange, but there is actually an absence of an experimental base and there is no modern scientific apparatus and equipment in the subsector. And as a consequence, the new preparations are being introduced into production and agriculture at slow rates.

The fraction of expenditures for scientific research is still very low--it comprises less than 1 percent of the selling cost of the preparations.

All these large and small details indicate that Glavmikrobioprom is still not adequately involved in development of research and production of mixed feed antibiotics for animal husbandry.

6521
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UDC: 541.139+541.15+541.67

INDIRECT MAGNETIC RESONANCE SPECTRA RECORDING METHODS FOR FREE RADICALS BASED ON SPIN EFFECTS IN RADICAL PAIR REACTIONS

Moscow KHIMICHESKAYA FIZIKA in Russian No 4, Apr 83
(manuscript received 27 Oct 82) pp 437-444

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[Abstract] A discussion is presented of work on problems of chemical magnetic radio spectroscopy, specifically the possible role of the so-called weak interaction in elementary chemical reactions. Methods are studied which are based on the use of spin effects in the reactions of radical pairs - the influence of magnetic fields and chemical polarization of nuclei in radical reactions. Most fully developed is the method of optical detection electron paramagnetic resonance of radical pairs. The principle of this method is explained by analyzing primary intermediate formation of the geminal ion radical pair in a radiation chemical process. The recording of magnetic resonance of free radicals based on the polarization of NMR signals, though it is not as highly sensitive as optical EPR detection, also is free of its major limitation, related to the need to form a luminescent product. The principle of this method is explained in more detail and illustrated examples are given. Radio frequency probing of molecules during the course of the chemical reaction is similar in terms of its technical specifics to the so-called radio frequency molecular probing method suggested previously. The principle of the method is as follows. It is easy to find the signal of a given group of nuclei in high resolution NMR spectroscopy. If a reaction occurs rapidly, the group will go over into the intermediate product without breaking up, then into the end product. By studying the behavior of various such label groups, one can gain an idea of the mechanism of the reaction just as with labeled atoms. The results studied illustrate the development of works on the creation of highly sensitive methods for recording magnetic resonance based on new phenomena - magnetic and spin effects in chemical reactions. Figures 5; references 14: 12 Russian, 2 Western.
[237-6508]

UDC: 541.127

USE OF LASER MAGNETIC RESONANCE TO STUDY ACTIVE INTERMEDIATE PARTICLES IN COMPLEX CHEMICAL REACTIONS

Moscow KHIMICHESKAYA FIZIKA in Russian No 4, Apr 83
(manuscript received 28 Sep 82) pp 468-477

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[Abstract] This review discusses the application of the laser magnetic resonance method to study elementary and complex chemical transformations with the participation of atoms and free radicals. Problems of LMR spectroscopy are practically not discussed. The method of LMR is based on displacement of the frequency of the rotary or vibrational-rotary line of a paramagnetic particle by a magnetic field due to the Seeman effect until it coincides with one of the lasing lines of a submillimeter or infrared band laser. Use of the resonant properties of the laser is an important factor in increasing the sensitivity of the method. The possibility of measuring small concentrations of free radicals makes the LMR method effective for determining the rate constants of elementary chemical reactions involving these radicals. References 49: 20 Russian, 29 Western.
[237-6508]

UDC 541.(64+127)

KINETICS OF FORMATION OF FREE RADICALS IN THE REACTION OF OZONE WITH SOLID POLYPROPYLENE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 2, Mar 83
(manuscript received 24 Aug 82) pp 400-404

KRISYUK, B. E., POPOV, A. A., GRIVA, A. P. and DENISOV, Ye. T., Department of the Institute of Chemical Physics, USSR Academy of Sciences, Chernogolovka, Moscow Oblast

[Abstract] A study of the initiating capacity of ozone in reaction with powdered isotactic polypropylene (PP), with the rate of interaction of PP and ozone determined by the rate of ozone absorption by the polymer, suggested the mechanism of formation of radicals. The null order of expenditure of the acceptor and the symbatic linear dependence of the rate of formation of free radicals and the rate of ozone absorption on the ozone concentration in the gaseous phase show that the formation of radicals is due to direct interaction of the ozone and the C-H bond of the macromolecule and not with secondary products accumulating in time. It seems that the initial stage of interaction of ozone with the saturated hydrocarbon molecule proceeds by the

same mechanism in the solid phase as in the liquid phase as indicated by the similarity of kinetic parameters for the liquid phase and for the solid phase. This similarity is only qualitative. Figures 3; references 14 (Western 2).
[223-2791]

UDC: 535.24:541.183.12.546.882

USE OF ION EXCHANGE MEMBRANES IN PHOTOMETRIC ANALYSIS

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA KHIMICHESKAYA in Russian No 2, Mar-Apr 83 (manuscript received 20 Dec 81) pp 36-39

LOBANOV, F. I., NURTAYEVA, G. K. and YERGOZHIN, Ye. Ye., Institute of Chemical Sciences, Kazakh Academy of Sciences, Alma-Ata

[Abstract] The sorbent consists of heterogeneous ion exchange membranes based on polyvinyl chloride, the ion exchange properties of which result from impregnation of the films with trioctylamine. The membranes produced are optically transparent. They are studied for potential use in the analysis of mixed complex compounds of niobium with 4-(2-pyridylazo)-resorcinol and secondary ligands such as oxalic, tartaric, citric, trioxyglutaric and mucinic acids. Figures 2; references 7: 3 Russian, 4 Japanese. [236-6508]

UDC 547.241+547.26'118+547.419.1

REACTIONS OF ACID ANHYDRIDES OF TRIVALENT PHOSPHORUS AND HETEROCOUMULENES--PHENYLISOCYANATE AND DIPHENYLKETENE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82
(manuscript received 9 Nov 81) pp 2187-2195

FOSS, V. L., LUKASHEV, N. V. and LUTSENKO, I. F., Moscow State University imeni M. V. Lomonosov

[Abstract] A study of the reaction of acid anhydrides of trivalent phosphorus with phenylisocyanate and diphenylketene gave special attention to assessment of factors determining the direction of the addition and further conversion of the forming adducts. The study of ^{31}P nuclear magnetic resonance spectra and infra-red spectra showed the reaction of trivalent phosphorus acid anhydrides with phenylisocyanate is thermodynamically controlled and leads to formation of adducts by C=N and C=O bonds, while the reaction with diphenylketones involves only the C=O bond. None of the adducts obtained showed a tendency toward isomerization in diphosphonates P(O)-C-P(O). Due to the reversibility of the reaction, addition to the phenylisocyanate, the forming adducts are readily converted into non-isomeric compounds with it, containing only tetracoordinated phosphorus atoms. References 11: 5 Russian, 6 Western.
[69-2791]

UDC 547.341:543.51

SYNTHESIS AND STUDY OF STRUCTURE OF BICYCLOOXAPHOSPHOLENES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82
(manuscript received 26 Jan 82) pp 2195-2199

NURTDINOV, S. Kh., ISMAGILOVA, N. M., ZYKOVA, T. V., TSIVUNINA, I. V., YEFREMOV, Yu. Ya. and MUSIN, R. Z., Kazan Chemico-technological Institute imeni S. M. Kirov; Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan Branch, USSR Academy of Sciences

[Abstract] Bicyclic derivatives of oxaphospholenes were obtained by the interaction of primary chlorophosphines and phosphorus trichloride with

cyclohexanone and methylcyclohexanone. Properties of the products synthesized were shown in a table and their structure, confirmed by data from infrared, nuclear magnetic resonance and mass spectra, was described and discussed. References 11: 10 Russian, 1 Western.
[69-2791]

UDC 547.1'118

INTERACTION OF THIOESTERS OF PHOSPHINOUS ACIDS WITH HYDROGEN IODIDE: FORMATION OF 'ANOMALOUS' PRODUCTS IN ARBUZOV REACTION

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 21 Dec 81) pp 2199-2205

AL'FONSOV, V. A., ZAMALETDINOVA, G. U., BATYYEVA, E. S. and PUDOVIK, A. N., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan Branch, USSR Academy of Sciences

[Abstract] A study of the reaction of S-ethyldiphenylthiophosphinite with hydrogen iodide showed that their interaction is accompanied by formation of diphenylphosphonium iodide, diphenyliodophosphine sulfide, ethyl mercaptan and ethyl iodide. In addition to diphenylphosphonium iodide, diphenyldiphenylphosphine, thiophenol and S-phenyldiphenyliodophosphonium iodide was formed in the reaction of S-phenyldiphenylthiophosphinite and hydrogen iodide. A schema of these reactions, including the substitution of thioalkyl (aryl) groups by halogen with subsequent interaction of diphenyliodophosphine with hydrogen iodide was described and discussed. References 13: 8 Russian, 5 Western.
[69-2791]

UDC 547.241

VINYL ETHERS OF PHOSPHORUS ACIDS, PART 23: PHOSPHORYLATION OF ETHERS OF DITHIOISOBUTYRIC ACID BY CHLORIDES OF TRIVALENT PHOSPHORUS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 13 July 81) pp 2205-2209

DANCHENKO, M. N. and GOLOLOBOV, Yu. G., Institute of Organic Chemistry, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Derivative of dithioisobutyric acids were used as an example in a study of the process of phosphorylation of ethers of dithiocarbonic acids. The structure and composition of the compounds were confirmed by elemental analysis, infra-red and nuclear magnetic resonance spectroscopy. It was found that the alkylthiobutanates interact with acid chlorides of trivalent phosphorus in the presence of triethylamine with formation of corresponding thiovinyl ethers of phosphorous acids. References 9.
[69-2791]

UDC 547.241

INTERACTION OF 1,5,2,3-PHOSPHAOXADIAZOLE-1-AMIDES WITH o-AZIDOPHENOL

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82
(manuscript received 19 Jan 82) pp 2209-2211

RAZHABOV, A. and YUSUPOV, M. M., Institute of the Chemistry of Plants, Uzbek SSR Academy of Sciences, Tashkent

[Abstract] A study of the interaction of 1,5,2,3-phosphaoxadiazole-1-amides and o-azidophenol showed that reactions of anilide, cyclohexylamide and N,N-diethylamide of 1,5,2,3-phosphaoxadiazole with o-azidophenol go smoothly with formation of spirophosphoranes. The structure of the compounds was confirmed by nuclear magnetic resonance spectra, infra-red spectra and mass spectrometric data. The chemical shifts of the phosphorus nuclei were typical of those for pentacoordinated phosphorus and the compounds have corresponding molecular weights. NH and C=N groups absorption bands were seen in the infra-red spectra. References 4 (2 Western).
[69-2791]

UDC 538.27+547.63+541.67

STEREOCHEMISTRY OF ORGANOPHOSPHORUS COMPOUNDS, PART 17: STEREOSPECIFICITY OF GEMINAL $^{2}J(P^{IV}CH)$ AND VICINAL $^{3}J(P^{III}OCH)$ CONSTANTS OF SPIN-SPIN INTERACTION

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82
(manuscript received 16 Dec 81) pp 2211-2218

SAMITOV, Yu. Yu., Kazan State University imeni V. I. Ul'yanov-Lenin

[Abstract] A discussion of analysis of the literature, concerning the assumption that any geminal constant of spin-spin interaction of $^{2}J_{NN}$, is strictly stereospecific, refutes some accepted viewpoints on this question. Analysis of geminal constants of spin-spin interaction between the phosphorus nucleus and the proton in molecules with a specific conformation showed the dependence of the constant $^{2}J(P^{IV}CH)$ on the angle ψ, formed by the axis of the P=O bond and the plane of the P-C-H atoms for the phosphoryl and phosphinate environment of the phosphorus. The dependence of the vicinal constant $^{3}J(P^{III}OCH)$ on the dihedral angle between the planes P-O-C and O-C-H for two discrete (gauche- and anti-planar) orientations of the P=O bond was demonstrated graphically. Figures 3; references 23 (14 Western).
[69-2791]

UDC 547.1' 118:543.42

EFFECT OF MEDIUM ON CONFORMATIONAL EQUILIBRIUM OF 2-X-2-METHYL-1,3,2-DIOXAPHOSPHORINANES (X=O, S, Se)

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 3 Nov 81) pp 2218-2223

SHAGIDULLIN, R. R. and KATSYUBA, S. A., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan Branch, USSR Academy of Sciences

[Abstract] Calculations based on the Onzager-Betcher-Abraham reactive field theory were used to explain the experimentally observed strong effect of the medium on the conformational equilibrium of 2-X-2-methyl-1,3,2-diosaphosphorines (X=O,S,Se). Reduction of the effects of the medium in some oxo-, thio- and selenium derivatives were associated with the corresponding growth of the molecular volume of the compound and with the dipole moments. Qualitative errors may result from disregard of the temperature dependence of the difference of enthalpies of the a- and e- forms of the compounds studied. The H values of the a- and e- conformers of the dioxaphosphorinanes examined in gas on the basis of the reactive field model agree with results of calculations performed by molecular mechanics. References 17: 13 Russian, 4 Western.
[69-2791]

UDC 547.127+547.387

PHOSPHORYLATED KETENES, PART 4: KINETICS AND MECHANISM OF REACTIONS OF DIETHYLPHOSPHONOPHENYLKETENE WITH PARA-SUBSTITUTED PHENOLS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 15 Mar 82) pp 2223-2227

VDOVENKO, S. I., YAKOVLEV, V. I., KOLODYAZHNYY, O. I. and KUKHAR', V. P., Institute of Organic Chemistry, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] The reaction capacity of phosphorylated ketenes was assessed by a study of the kinetics and mechanism of reactions of diethylphosphonophenylketene with para-substituted phenols in CCl_4 in the absence of catalysts. The reaction studied is a first order reaction for both ketene and for phenol and the diethylphosphonophenylketenes and phenol apparently form a cyclic complex in the transitional state. The kinetic and activation parameters of the reaction were evaluated and the possible mechanism of the interaction of the phosphorylated ketenes with the phenols was discussed. Figures 4; references 12: 7 Russian, 5 Western.
[69-2791]

UDC 547.341

INTERACTION OF DIETHYL-2-HALOGEN-2-ETHOXYETHENYLPHOSPHONITES WITH SUBSTITUTED NITRILIMINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 12 Mar 82) pp 2172-2176

PLATONOV, A. Yu., TIMOFEYEV, T. N., TROSTYANSKAYA, I. G., LUZIKOVA, Ye. V., KAZANKOVA, M. A. and CHISTOKLETOV, V. N., Leningrad Technological Institute of the Pulp and Paper Industry; Moscow State University imeni M. V. Lomonosov

[Abstract] A study of reactions of diethyloethers of alkenylphosphonous acids and nitrilimines showed that cyclization with splitting of the halogen atom from the phophoric component occurs in these reactions. The interaction of diethyl-2-halogen-2-ethyoxyethenylphosphonites with substituted nitrilimines forms products of 1,3-dipolar cycloadditions--derivatives of 4-oxo-1,4-dihydro-1,2,4-diazaphosphorins. The reaction goes through intermediate formation of cyclic phosphorus ilides, the conversion of which into end heterocycles proceeds simultaneously in two directions with elimination of the halogen atoms. Paramagnetic resonance spectra were recorded on a "Perkin-Elmer R-12A" spectrometer. References 3 (Russian). [69-2791]

UDC 541.6: 547.879

SPATIAL STRUCTURE OF PHOSPHORUS-CONTAINING COMPOUNDS, PART 24: ULTRA-VIOLET AND ^{13}C NUCLEAR MAGNETIC RESONANCE SPECTRA OF 2-ARYLOXY-1,3,2-DIOXAPHOSPHORINANES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 1 Feb 82) pp 2176-2182

ARBUZOV, B. A., ARSHINOVA, R. P., VINOGRADOVA, V. S. and CHERNOV, P. P., Scientific Research Institute imeni A. M. Butlerov; Kazan State University imeni V. I. Ul'yanov-Lenin

[Abstract] A study of 2-aryloxy-1,3,2-dioxaphosphorinanes by ultra-violet spectroscopy (with use of the Specord Uv-Vis spectrophotometer) and ^{13}C nuclear magnetic resonance spectroscopy (with the Bruker WH-90 spectrometer) showed, in the ^{13}C paramagnetic resonance spectra of 2-aryloxy-1,3,2-dioxaphosphorinanes with tricoordinated and tetracoordinated phosphorus, a reduction of screening of the para-carbon atom in comparison with anisoles, indicating a reduction of the effect of conjugation between the p- unshared pair of electrons of the oxygen atom and the pi-orbitals of the phenyl ring. Preservation of the autonomous organization of the benzene nucleus was seen in the ultra-violet spectra of the unsubstituted

2-phenoxy-1,3,2-dioxaphosphorinanes and of the triphenylphosphite which indicates inhibition of the p-pi conjugation. Figures 3; references 18: 11 Russian, 7 Western.
[69-2791]

UDC 547.241+547.26'118+547.419.1

INTERACTION OF TETRAETHYLDIAMIDOPHOSPHOROUS ACID ANHYDRIDE AND CARBONYL COMPOUNDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 9 Nov 81) pp 2183-2186

FOSS, V. L., LUKASHEV, N. V., TSVETKOV, Yu. Ye. and LUTSENKO, I. F., Moscow State University imeni M. V. Lomonosov

[Abstract] A study of 31 nuclear magnetic resonance spectra on JEOL JNMC-60HL and Varian FT-80A instruments with use of 85% H_3PO_4 as an external standard in order to determine the possibility of the reaction of addition to aldehydes of tetraethyldiamidophosphorous acid anhydride showed that the addition to aromatic aldehydes and splitting of the P-N bond by hydrochlorides of amines go at comparable rates for tetraethyldiamidophosphorous acid anhydride. In the absence of electrophilic admixtures, the anhydride readily joins the carbonyl group of these aldehydes with formation of adducts with $P^{IV}(O)$-C-O-P^{III} grouping. The reaction of tetraethylpyrophosphate with fluoral produces adducts of the same type and the reaction with hexafluoracetone goes similarly but with formation of adducts containing a grouping with $P^{IV}(O)$-O-C-P^{III} bonds. The adducts synthesized show no tendency to regroup into isomeric diphosphonates $P^{IV}(O)$-C-$P^{IV}(O)$. References 12; 7 Russian, 5 Western.
[69-2791]

UDC 547.79+547.26' 118

EFFECT OF ELECTRON AND SPATIAL FACTORS ON DIMERIZATION OF N-ARYLIMINO-4,5-BENZO-1,3,2-DIOXAPHOSPHOLS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 29 May 81) pp 2227-2235

KUKHAR', V. P., GRISHKUN, Ye. V. and KALIBABCHUK, N. N., Institute of Organic Chemistry, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] A series of compounds with electronegative substituents in different positions of the aromatic nucleus of the arylamino group were obtained and the ^{31}P nuclear magnetic resonance and mass spectroscopy were studied in order to compare the effect of the substituents on the dimerization

of the trichlorophosphazoarenes and 2-arylimino-2-chloro-4.5-benzo-1,3,2-dioxaphosphols. It was found that the 2-N-arylimino-2-chloro-(phenoxy)-4,5-benzo-1,3,2-dioxaphosphols in the aromatic nucleus exist in solutions in the form of dimers or in the form of a dimer-monomer mixture. Electronegative substituents, however, as opposed to trichlorophosphazoarenes, did not prevent dimerization of such immunophosphols even in the ortho-position. References 15: 9 Russian, 6 Western.
[69-2791]

UDC 546.18

SPECTRAL STUDY OF SOLUTIONS OF POLYIODIDE SALTS OF PHOSPHONIUM

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82
(manuscript received 11 Nov 81) pp 2235-2239

MAKOVETSKIY, Yu. P., DIDKOVSKIY, V. Ye., BOLDESKUL, I. Ye., FESHCHENKO, N. G. and KALIBABCHUK, N. N., Institute of Organic Chemistry, Ukrainian SSR Academy of Sciences

[Abstract] Products of alkylation of red phosphorus by alkyl iodides were determined by use of ultraviolet spectroscopy and nuclear magnetic resonance spectra data. It was found that such products in the solutions studied, in the presence of a catalytic quantity of iodine, is in the form of dissociated salts of bistriiodide hexaalkylbiphosphoniums. Spectrophotometric measurements of the quaternary phosphonium polyiodides in acetylnitrile showed that absorption bands λ_{max} 293, 386 nm belong to the polyiodide anion $I(I_2)_n$. It was found that a component of the polyiodide-ion is the complex triiodide-anion I_3. It was found that in solvents with highly pronounced nucleophilic properties, molecular iodine can be ionized with further conversion into a polyiodide-anion. References 17: 5 Russian, 12 Western.
[69-2791]

UDC 547.558.1

SYNTHESIS AND STUDY OF PHOSPHONIUM COMPOUNDS CONTAINING A BENXODIOXANE CYCLE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82
(manuscript received 31 Dec 81) pp 2252-2256

MEGERA, I. V., VLAD, V. L. and SIDORCHUK, I. I., Chernovtsy Medical Institute

[Abstract] Experimental data were presented from a study of the reaction of 6-chloromethyl-benzo-1,4-dioxane, 6,7-bis(chloromethyl)benzo-1,4-dioxane

2-bromomethylbenzo-1,4-dioxane with tertiary phosphines and from the study of some chemical and physiological properties of the benzo-1,4-dioxanphosphonium compounds obtained. Conditions of synthesis of mono- and bisphosphonium salts containing the benzo-1,4-dioxane cycle were worked out. Some dioxane derivatives of stilbenes were synthesized by conversion of the synthesized phosphonium salts into phospholipids and by reactions of the latter with aromatic aldehydes. After this, a mixture of cis- and trans-isomer was formed with their ratio depending on the olefination reaction.
References 4 (Russian).
[69-2791]

UDC 541.138.2

ANODIC OXIDATION OF SOME DERIVATIVES OF P(III) ACIDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82
(manuscript received 1 Mar 82) p 2358

NIKITIN, Ye. V., ROMAKHIN, A. S., MALAYEV, V. G., PARAKIN, O. V., IGNAT'YEV, Yu. A., ROMANOV, G. V., KOSACHEV, I. P., NASYROV, M. K., KARGIN, Yu. M. and PUDOVIK, A. N., Kazan State University imeni V. I. Ul'yanov-(Lenin); Institute of Physical Chemistry imeni A. E. Arbuzov, Kazan Branch of the USSR Academy of Sciences

[Abstract] Preparative electrolysis of $(PrO)_2$ PSNa in the presence of thiophene, performed to assess the possibility of electrochemical oxidation of thioderivatives in aromatic or heteroaromatic compounds made it possible to isolate 0,0'-dipropylthienylthiophosphate $(PRO)_2P(S)$ (SC_4H_3) with a yield of ~10%. The experimental findings are compared with calculated values.
References 2 (Russian).
[69-2791]

UDC 547.468.133+547.558.1

PROTOTROPIC PHOSPHORYL-HYDROXYILIDE TRIAD TAUTOMERISM

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82
(manuscript received 9 Mar 82) pp 2358-2360

ALADZHEVA, I. M., LEONT'YEVA, I. V., PETROVSKIY, P. V., MASTRYUKOVA, T. A., Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow

[Abstract] Phosphoryl-hydroxyilide tautomerism was studied with [(hydroxydiphenylphosphoranilidene) carbethoxymethyl] triphenylphosphonium chloride as an example. In crystalline form, the compound exists in the hydroxyilide

form. After dissolving the compound in $CHCl_3$ the infra-red spectrum shows, in addition to other bands, a band of medium intensity at 1730 cm^{-1} typical for C=O vibrations of the unconjugated ester group which indicates the presence in the solution of the CH-form which is confirmed by nuclear magnetic resonance data. References 8 (2 Western).
[69-2791]

UDC 541.67:547.26' 118

CONFORMATIONS OF 2,2-DIMETHYL-5-PHENYL-1,3,2,5-DIOXASILAPHOSPHORINANE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 31 Dec 81) pp 2249-2252

ISHMAYEVA, E. A., PATSANOVSKIY, I. I., ZYABLIKOVA, T. A., STRELKOVA, Ye. N. and ROMANOVA, I. P., Kazan State University imeni V. I. Ul'yanov-Lenin; Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan Branch of the USSR Academy of Sciences

[Abstract] Studies using methods of nuclear magnetic resonance, dipole moments and the Kerr effect showed that conformational equilibrium of two cruciform forms is realized in the liquid state and in solutions of 2,2-dimethyl-5-phenyl-1,3,2,5-dioxasilaphosphorinane. References 14: 9 Russian, 5 Western.
[69-2791]

UDC 547.26'118+547.421.51'262

REACTIONS OF ALKYLDICHLOROPHOSPHINES WITH 2-ETHOXYTETRAHYDROPYRANE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 8 Jan 82) pp 2360-2361

GAZIZOV, M. B., GIZATULLINA, I. Kh., RAZUMOV, A. I., Kazan Chemico-technological Institute imeni S. M. Kirov

[Abstract] Alkylchlorophosphines were found to react with 2-ethoxytetrahydropyrane by substitution of the ethoxygroup by chlorine and by rupture of the heterocycle. The products of substitution of substances had sufficient nucleophilicity to form, in the secondary processes, derivatives of tetracoordinated phosphorus. The structure and composition of the compounds were confirmed by infra-red and nuclear magnetic resonance spectra and by total elemental analysis. References 8 (2 Western).
[69-2791]

UDC 547.241

|2+2|CYCLOADDITION OF ISOCYANATES TO CARBOIMIDOPHOSPHENE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 15 Mar 82) pp 2361-2362

KOLODYAZHNYY, O. I., Institute of Organic Chemistry, Ukrainian SSR Academy of Sciences

[Abstract] This report shows that carboimidophosphenes are active in reactions of |2+2|cycloaddition. It was shown that di-tret-butylcarboimidophosphene readily joins along the P=C bond of isocyanate, being converted into four-member cyclic compounds--azaphosphetidinonimines. The structure of azaphosphetidinonomines was confirmed by analytical data, infra-red, paramagnetic resonance, nuclear magnetic resonance and mass spectra studies. [69-2791]

UDC 547.241+547.558.1

REDISTRIBUTION REACTION IN TRIBUTYLPHOSPHINE-PHOSPHORUSTRICHLORIDE SYSTEM

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 18 Feb 82) p 2363

KHOKHLOV, P. S. and SOKOLOVA, G. D., All-Union Scientific-Research Institute of Phytopathology, Bol'shiye Vyaz'my

[Abstract] There was found direct confirmation of the lability of the phosphorus-carbon bond on the basis of the redistribution reaction of butyl radicals in a tributylphosphine-phosphorustrichloride system, leading to formation of butyldichlorophosphine. Paramagnetic resonance spectra data indicated that the reaction is not accompanied by isomerization of the butyl radical. References 4: 1 Russian, 3 Western.
[69-2791]

UDC 547.26'118

PRODUCTION OF ^{32}P LABELLED PHOSPHORYLATED BENZIMIDAZOLES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 15 Jan 82) pp 2363-2365

MAKAROV, A. M., MATEVOSYAN, G. L. and ZAVLIN, P. M., Leningrad Agricultural Institute

[Abstract] A nuclear-chemical reaction produces $^{33}Cl(n\ alpha)^{32}P$ labelled ^{32}P phosphorylated benzimiadazole with the maximum specific activity in a

state without a carrier. After irradiation of carbon tetrachloride, saturated by benzimidazole on a Po-Be source of fast neutrons, there was identified a previously unknown mono-, di- and tri-(1-benzimidazolido)phosphate, production of which is based on specific chemical conversions of high-energy ^{32}P atoms with an energy of 50,000 eV outlined in this report. After careful isolation of the target from the oxygen in a sealed ampule, it was possible to obtain also (tri(1-benzimidazolido)phosphate. The method described produces five ^{32}P labelled compounds, with general activity right up to 0.936 MBk. The purity and individuality of the compounds obtained are confirmed by paper chromatography and radiochromatography. References 4 (Russian, 3 by Matevosyan).
[69-2791]

UDC 547.26' 118

SYNTHESIS AND CHEMICAL CHARACTERISTICS OF 2-ALKOXY-5,5-DIBROMOMETHYL-1,3,2-DIOXAPHOSPHORINANE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 52, No 10, Oct 82 (manuscript received 29 Mar 81) pp 2366-2367

KHALTURIN, V. V. and NIFANT'YEV, E. Ye., Moscow State Pedagogical Institute imeni V. I. Lenin

[Abstract] Synthesis of previously unknown 2-alkoxy-5,5-dibromomethyl-1,3,2-dioxaphosphorinane from dibromopentaerythrite (I) and acid chlorides of enshutkin [$PORCl_2$] in ether at 10 C is described and their chemical characteristics are discussed. The process described is the first example of opposing polycondensation in the phosphorinane series. A specific feature of this reaction is the preservation of the phosphorinane cycles which may be important in further structurization of polyphosphonates. References 1 (Russian).
[69-2791]

UDC 542.91:547.35:547.558.1

REACTION OF FLUORENYL DERIVATIVES OF GROUP IV A ELEMENTS WITH PHOSPHORUS ILIDES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 2, Mar 83 (manuscript received 24 Jul 82) pp 369-373

BORISOVA, I. V., ZEMLYANSKIY, N. N., LUZIKOV, Yu. N., USTYNYUK, Yu. A., BEL'SKIY, V. K., KOLOSOVA, N. D., SHTERN, M. M. and BELETSKAYA, I. P., corresponding member of the USSR Academy of Sciences, Scientific Research Physico-chemical Institute imeni L. Ya. Karpov, Moscow; Moscow State University imeni M. V. Lomonosov

[Abstract] A study of the reaction of fluorenyl derivatives of Si, Ge, and Sn with phosphorus ilides showed that the interaction of fluorenylchlorosilanes

with phosphorus ilides leads either to corresponding carbanions or to betaines. The general scheme of the reaction is presented and discussed. The structures of the compounds studied are confirmed by nuclear magnetic resonance and the findings are tabulated and discussed. It was assumed that phosphonium salts of heterochloroorganic derivatives of fluorene and silicophosphoroorganic betaines are promising compounds for generating fluorenilides of group IV A elements. References 15 (11 Western). [223-2791]

UDC 547.26.118

Ad_{E-3} MECHANISM OF THE REACTION OF SULPHENYL CHLORIDES WITH VINYLPHOSPHONES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 2, Mar 83 (manuscript received 22 Jun 82) pp 373-377

KUTYREV, G. A., KAPURA, A. A., CHERKASOV, R. A. and PUDOVIK, A. N., corresponding member of the USSR Academy of Sciences; Kazan State University imeni V. I. Ul'yanov-Lenin

[Abstract] The demonstration of the possibility of addition reactions of sulphenyl-chlorides and unsaturated compounds proceeding according to the Ad_{E-3} mechanism showed that two molecules of the unsaturated reagent participate in formation of the transition state of the limiting stage of the reaction. Realization of the process requires slightly pronounced π-donor properties of the C=C bond of the olefin and the presence of an n-acceptor fragment in the reacting system. Vinyl phosphonates were found to present a suitable combination of the required factors while vinylsilanes were less suitable. References 13: 7 Russian, 6 Western. [223-2791]

UDC 541.49

COORDINATION PROPERTIES OF METHYLENE-, ETHYLENEDIPHOSPHINE DIOXIDES AND CARBAMAYLMETHYLPHOSPHINE OXIDES IN PHOSPHORUS OCTAHEDRAL COMPLEXES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 1, Mar 83 (manuscript received 9 Nov 82) pp 147-151

IL'YIN, Ye. G., SHCHERBAKOVA, M. N., BUSLAYEV, Yu. A., MEDVED', T. Ya., NESTEROVA, N. P. and KABACHNIK, M. I., Institute of General and Inorganic Chemistry imeni N. S. Kurnakov; USSR Academy of Sciences Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences; Moscow

[Abstract] This work was an attempt to establish methods of coordination of bidentate ligands which have two isolated P=O groups and a distinctly

long hydrocarbon bridge between them--or which have P=O and C=O groups--exemplified in a study of reactions of $Ph_2P(O)_{II}CH_2P(O)Ph_2L$, $Ph_2P(O)(CH_2)_2P(O)Ph_2(L^I)$ and $Ph_2P(O)CH_2(O)C(O)NR_2$(R=Et, Bu) (L^{II}, L^{III}) with phosphorus pentafluoride in CH_2Cl_2. It was found that methylenediphosphine dioxides may be coordinated with phosphorus pentafluoride monodentately or chelately with substitution of a fluorine ion andformation of a tetrafluoride cation. Increasing the length of the hydrocarbon bridge between the P=O groups upon transition to ethylenediphosphine dioxide did not close the chelate ring, instead, coordination of the ligand to one or two PF_5 molecules occurs. Carbamaylmethylenephosphine oxides are coordinated to harsh Lewis acids monodentately through phosphoryl groups and bidentately with closure of the chelate ring and formation of cation tetrafluoroforms containing three types of non-equivalent fluorine atoms. Figures 4; references 15 (Western 6).
[220-2791]

UDC: 539.196:541.124.2

ELECTROPHILICITY AND NUCLEOPHILICITY OF COMPOUNDS WITH P=O- AND P=N-GROUPS IN INTERMOLECULAR INTERACTIONS

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 3, Mar 83 (manuscript received 19 Apr 82) pp 289-293

TSYMBAL, I. F. and RYL'TSEV, Ye. V., Institute of Organic Chemistry, Ukrainian Academy of Sciences

[Abstract] Results are presented from a comparative study of intermolecular reactions involving phosphazo ($R_3P=NY$) and phosphoryl compounds. Having similar electron structure of the P=X (X=O or NY) group, they can act as electron donors or acceptors depending on the electron properties of R and Y as well as on the properties of their partners in the intermolecular reactions. The results indicate that, for a number of phosphazohydrides, phosphazoalkanes and phosphazochlorides, as electronegativity of R increases the proton-acceptor capacity of the compound decreases. The electrophilicity of the phosphazo compounds is determined by the electron properties of the substituents R and Y in the $R_3P=NY$ compounds. The difference in properties of phosphazo and phosphoryl compound can be explained by the difference in electron overlap in the P=N and P=O groups which define the basic properties of these compounds. Figure 1; references 4 (Russian).
[235-6508]

UDC 621.892

UNIFICATION OF LUBRICANTS FOR SURFACE APPLICATION GAS-TURBINE ENGINES

Moscow KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 4, Apr 83
pp 8-9

KIRDAKOV, B. F., VILENKIN, A. V., NOVOSARTOV, G. T., BABENKO, V. N. and GUTENEV, B. S.

[Abstract] Recent introduction of gas turbine engines in surface operations generated novel requirements on the lubricants used in them, especially in their use in upper northern regions. Use of several lubricants developed for aviation or marine application have been used in such engines resulted in high operational costs. Physical properties of these oils were analyzed and tested under operational conditions. It was shown that the lubricant used in subsonic aviation engines MS-8p could be used effectively for long periods (more than 300 hrs) without changing oil on surface gas turbine engines operating in temperature range -40 to +40°C.
[250-7813]

UDC 662.753:629.7.036

REACTIVE FUELS FROM WEST SIBERIAN PETROLEUMS

Moscow KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 4, Apr 83
pp 9-11

GORENKOV, A. F., KLYUYKO, I. G., LIFANOVA, T. A. and KUPREYEV, A. I.

[Abstract] Physical properties of reactive fuels vary from oil to oil and depend on the fraction collected, especially on its final boiling point. Commercial crude from west Siberian deposits was subjected to a detailed study, collecting 20°C fractions from 120° to 280°C. All of the indices tested showed gradual trend upward with temperature increase. From this mixture three fractions of the fuel with final boiling points of 250, 260 and 280°C were obtained and analyzed. It was shown that the fuel

which begins to crystallize at -50°C (all three fractions) satisfied GOST 10227-62 standards for T-1 type fuel. The yield of it is 16% higher than the yield of the fuel which crystallizes at -60°C. Further increase in the crystallization temperature resulted in elevated content of naphthalene type hydrocarbons which made it unsatisfactory for aviation purposes.
[250-7813]

UDC 665.637.72-405:665.761.6

USE OF PARAFFIN CONTAINING OIL WHICH CANNOT BE PRESSED OUT AFTER CRUDE OIL DEPARAFFINIZATION FOR WHITE OILS

Moscow KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 4, Apr 83 pp 11-13

POTANINA, V. A., MARCHEVA, Ye. N. and PONOMAREVA, T. P., All-Union Scientific Research Institute of Petroleum Processing

[Abstract] Low solidification temperature oils are obtained by low temperature deparaffinization which results in a by-product paraffin containing oil which cannot be pressed out, consisting of 99% naphthene-paraffin hydrocarbons with a composition similar to medical and cosmetic oils. This material was examined as a possible source for production of vaseline. It was discovered that vaselines prepared from this material satisfied the GOST standard for the use in medical, veterinary and capacitor application. References: 6 (Russian).
[250-7813]

UDC 665.63.004.17

EFFECT OF FRACTIONAL COMPOSITION WEIGHTING OF REACTIVE FUELS ON YIELD OF DIESEL AND LIGHT FUELS

Moscow KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 4, Apr 83 pp 13-16

MITUSOVA, T. N., KALININ, A. A., KAMINSKIY, E. F., PRIBYTKOVA, N. M., PRIGUL'SKIY, G. B., SAID MAAFI and YELISEYEVA, Ye. N., All-Union Scientific Research Institute of Petroleum Processing and Moscow Institute of Petrochemical Research and Gas Processing imeni I. M. Gubkin

[Abstract] Effect of the increased temperature of crystallization initiation of the reactive fuels from Usinsk petroleum obtained by weighting of its fractional composition on the yield of gasoline and diesel fractions and of total light fuels was studied. It was shown that with

rising temperature of crystallization of reactive fuel from -55 to -40°C the content of gasoline fractions (120-180°C) dropped from 55 to 40 rel-%, while the diesel fuel fractions (above 180°C) increased correspondingly. The increase in the overall yield of reactive fuel based on crude petroleum results in lower fraction of gasoline, standard diesel fuel and total light fuels. The results led to a conclusion that Usinsk petroleum fuel should be obtained from the crude with minimum possible crystallization temperature to maximize the yield.
[250-7813]

UDC 615.014.8:678]:012

STUDY OF POLYMER COMPOSITIONS FOR MEDICAL COVERINGS AND PROCESSES FOR THEIR PRODUCTION

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 17, No 3, Mar 83 (manuscript received 19 Jan 82) pp 347-353

VAYNSHTEYN, V. A. and NAUMCHIK, G. N., All-Union Scientific Research Technological Institute of Antibiotics and Enzymes for Medical Purposes, Leningrad

[Abstract] Numerous studies of polymer coverings for wounds and burns that reabsorb, dissolve in wound exudate, or have vapor dispersing or hemostatic qualities, and methods for producing them, have been published. The authors present a comparative study of such production and suggest optimal polymer composition for reabsorbing types. Of three methods for production, including sprinkling and drying, periodic pulverization and sublimational drying of frozen solutions on trays, the latter was regarded to be preferable since it yielded films that were elastic, porous, readily permeable for air and vapors and highly absorbent for wound exudants. The pulverization method inactivated certain enzymes, while the first method had numerous shortcomings. Best results came with a combination of cellulose ester and polyvinylpyrrolidone or the latter and polyvinyl alcohol. References 14: 5 Russian, 1 Czech, 8 Western.
[232-12131]

UDC 615.47.03:615.45.012

THIN-LAYER ROTOR VAPORIZERS IN PRODUCTION OF MEDICAL PREPARATIONS (SURVEY)

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 17, No 3, Mar 83 (manuscript received 23 Apr 82) pp 356-361

MARCHENKO, A. N., ANOKHIN, G. A. and VITER, A. V., Ukrainian Scientific Research and Design Institute for Chemical Machinebuilding, Kharkov

[Abstract] Thin-layer vaporizers such as those used for drying milk are improved greatly by use of rotor apparatuses that allow intensive heat and

mass exchange by eliminating the negative effects of viscous forces using external mechanical energy. The authors survey several types of equipment, including those with rotors that function through a gas or vapor layer, those with a liquid layer for heat exchange, and ones with rotors that spread substances that otherwise clog the heat-exchange surface. Soviet production includes a spraying version that is very efficient where low-viscosity liquids are being processed. Rotor apparatuses with horizontal action, and ones used for distilling nad vacuum rectification column processes, are also discussed. The importance of processing time and limitations on mass transfer are noted as factors in choosing equipment for any given production task. Figures 7; references 2: 1 Russian, 1 Western.
[232-12131]

SHORTAGE OF CELLULOSE AND CAUSTIC SODA DELIVERIES REPORTED

Moscow PRAVDA in Russian 3 Mar 83 p 2

[Article by V. Shvetsov, Ryazan: "Petitions from Ryazan"]

[Text] Almost 2 years ago, a group of workers of the Ryazan Chemical Fibers Plant wrote an article in PRAVDA. The letter discussed the sad lot of one of the flagships of the sector, which had found itself in a difficult economic situation. A once leading enterprise had found itself among the ranks of lagging enterprises. For two 5-year plans running, it has made both ends meet only by correcting the plans and through subsidies. The main cause is the chronic disbalance of the production tasks with raw material deliveries. The hope was expressed that the new Ministry of the Chemical Industry, now freed of concerns for mineral fertilizer production, would be able to establish schedule discipline, meet the needs of individual production collectives and assist the lagging enterprises.

The letter from the workers was not given the proper attention at the ministry. An answer to the editors came from Soyuzkhimvolokna [not further identified]. It was the usual standard form reply: the criticism was correct and measures were planned. However, the authors of the letter and the entire plant collective firmly believed that newspaper publicity would help and that the enterprise would regain its former glory. And not only did they await changes, but they repaired to work at full tilt, which they knew how to do. After all, during those unfortunately rare months when there is raw material, the plant immediately goes to full capacity.

I recall how the plant managers and the social organizations persistently attempted to make themselves heard at the Ministry of the Chemical Industry.

I am leafing through a new chronicle. "Dear Vladimir Vladimirovich!" The secretary of the plant party committee V. G. Korotkaya appealed to minister V. V. Listov in January 1982. "The collective hoped that after the article of the group of plant workers in PRAVDA the opportunity will be found to render real assistance in supply of raw material to one of the sector's largest enterprises. However, the plant did not fulfill the plan in 1981 as well due to an interruption in caustic soda deliveries. The collective has again been placed in a difficult situation."

"Dear Valentina Gavrilovna!" the deputy minister V. S. Smirnov answered her. "The cellulose and caustic soda stocks were fully allocated to the Ryazan plant for 1982. The production administration has established monitoring over their sales."

The effectiveness of ministry monitoring is obvious from subsequent events. Thus, an emergency message came over the teletype from Ryazan to Moscow on 8 July 1982: "Two chemical shops have been shut down completely due to an absolute lack of caustic soda. The spinning mills are operating at one-third capacity. We urgently request that a principle decision be made: either support the production plan with raw material or bring the task into conformity with the real resources."

Of course, the producers themselves should also seek reserves of raw material and should conserve this caustic soda in every way possible. But there are limits even to this.

Incidentally, not only the Ryazan plant found itself in such a complex situation. During the past few years, caustic soda production was weakly developed and introduction of new capacities has continuously been interrupted due to miscalculations of USSR Gosplan and Minkhimprom. Cellulose deliveries are also strained. At one time the Ryazan workers were not supplied with ordinary salt until they themselves found natural brine reserves. In short, the production plans were not balanced with raw material resources. Operating at half capacity, the plant interrupts deliveries, pays enormous fines and creates a nervous situation at allied enterprises.

Neither the "emergency report" nor all other petitions to which the ministry ceased to answer helped the Ryazan workers. The only consolation achieved by the plant is routine correction of the plan, creating the usual visibility of well being.

The first months of the new year also did not bring relief. Shortfalls of caustic soda increase as before and petitions and messengers to everywhere fly from Ryazan as before.

6521
CSO: 1841/187

PROPYLENE AND STYRENE PRODUCTION BEGUN

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Feb 83 p 1

[Article by U. Bogdalov, special correspondent: "They Have Become Operational"]

[Text] The propylene and styrene oxide plant of the Nizhnekamskneftekhim Association, which recently became operational, has dispatched its first product to customers. An efficient production process has been organized here. Bringing the new plant up to design capacity will make it possible to meet the needs of the national economy for propylene oxide, from which simple polyesters widely used in the electrotechnical, machine building, aviation and motor vehicle industry, are made and also the need for styrene, from which almost 1,000 articles are produced.

The shift headed by M. Borisov produced the first product.

6521
CSO: 1841/187

UDC 678.5(470)

60 YEARS OF PLASTICS INDUSTRY IN RSFSR

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 82 pp 4-5

LEPIN, V. Yu., chief specialist, Department of Chemical Industry, RSFSR Gosplan

[Abstract] A brief historical survey is presented of the development and achievements of the plastics industry in the Russian SFSR. Beginning in 1916 in Orekhovo-Zuyevo with an annual production of 10-16 tons, the industry has developed to the point where it now accounts for 62% of the total plastics production in the USSR. It is anticipated that in the current Five-Year Plan further improvements will be made in increasing productivity, controlling costs, and in expanding automation.
[64-12172]

UDC 678.5.003.13(477)

UKRAINIAN PLASTICS INDUSTRY DURING SOVIET RULE

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 82 pp 6-7

KALECHITS, V. V., deputy chief, Department of Chemical Industry, Ukrainian SSR Gosplan

[Abstract] A brief historical course of the plastics industry in Ukraine is presented, and of the administrative bodies responsible for its development. Despite a serious blow dealt by the advancing Fascist armies in World War II, recovery and reconstruction was rapid thereafter with the establishment of many new plants and research organizations which favored a constant increase in productivity and in the variety of products. Plans made for the 11th Five-Year Plan call for further improvements in research, productivity, cost effectiveness, and utilization of the plastics produced in the Ukrainian SSR.
[64-12172]

UDC 678.5.001(574)

PLASTICS PRODUCTION AND ACHIEVEMENTS OF POLYMER SCIENCE IN KAZAKHSTAN

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 82 pp 8-9

DASHKOV, K. S., deputy chairman, Kazakh SSR Gosplan; DOSKAZIYEV, A. G., chief, Department of Science and Technology, Kazakh SSR Gosplan and POD"YACHEV, Yu. A., chief, Department of Chemical and Fuel Industry, Kazakh SSR Gosplan

[Abstract] The current state of plastics production and of polymer science in Kazakhstan is reviewed. Research on plastics in Kazakhstan commenced in the fifties, with concentration on polycondensation, synthesis of ion-exchange and fire-retardant polymers, olefin polymerization, and definition of the properties of plastics. At the present time plastics production in Kazakhstan exceeds utilization and plans have been made to increase the use of plastic products as replacements for metal products whenever possible.
[64-12172]

UDC 678.686.01:546.268.2

POLYMERS PRODUCED BY INTERACTION OF ALIPHATIC DIEPOXIDES WITH ISOCYANATES

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 82 pp 12-13

VALUYEVA, L. F. and LAPITSKIY, V. A.

[Abstract] Brief technical details are provided for the synthesis of new epoxyurethane oligomers (Epurol) through the interaction of low-viscosity OH-containing diepoxides with various isocyanates; such oligomers contribute to greater elasticity and durability of the resultant polymers. The resultant products have been used in the manufacture of adhesives and glues, as well as in various chemical processes and in machine construction. Figures 2; references 8 (Russian).
[64-12172]

UDC 678.762.2-135.473.392.11.02

COPOLYMERIZATION OF 2,3-DICHLOROBUTADIENE WITH α-CHLOROACRYLONITRILE

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 82 pp 17-18

AVETISYAN, Yu. L. and BOSHNYAKOVA, A. I.

[Abstract] Technical details are outlined for the preparation of 2,3-dichlorobutadiene (DCB) + α-chloroacrylonitrile (CAN) copolymers, with an

evaluation of the properties of some of the resultant products. Analytical data showed that the various DCB-CAN copolymers were relatively stable, noninflammable, and possessed high dielectric constants.
References 4 (Russian).
[64-12172]

UDC 678.632'32'21.01:541.11

HEAT SHOCK DESTRUCTION OF PHENOL-FORMALDEHYDE RESINS

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 82 pp 20-21

PETROVA, O. M., MEN'SHUTIN, V. P. and GORSHKOV, V. S.

[Abstract] Kinetic studies on the pyrolysis of phenol-formaldehyde resins showed that in the 400-550°C range the rate constant of destruction was independent of the temperature ($k = 0.229-0.232$ min^{-1}), but increased exponentially at higher temperrature ($k = 0.414$ at 600°C and 1.730 min^{-1} at 1000°C). The respective energies of activation at 550°C or less and in the 600-1000°C range were 25.1 and 36.4 kJ/mole. The relatively low activation energies at both temperature intervals reflect the thermodynamic instability of the phenol-formaldehyde resins. Figures 1; references 4: 2 Russian, 2 Western.
[64-12172]

UDC 678.5.067.5:678.674.4:620.193.2

CORROSION RESISTANT GLASS FIBER PLASTICS FROM POLYESTER MOLDING MATERIAL

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 82 pp 29-31

NAUMETS, L. A. and NAUMETS, V. N.

[Abstract] Investigations were conducted on the effectiveness of magnesium oxide as a thickening agent for polyester resins. Evaluation of the various products demonstrated that MgO is an effective thickener for rendering polyester premixes and prepregs. suitable for the manufacture of various corrosion resistant glass fiber articles for industrial use. Figures 3; references 10: 7 Russian, 3 Western.
[64-12172]

UDC 678.742.201:543.872

PRINCIPAL METHODS FOR STUDYING ELECTROLYTE DIFFUSION IN POLYMERS (LITERATURE REVIEW)

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 82 pp 38-42

ZAIKOV, G. Ye., MARKIN, V. S. and IORDANSKIY, A. L.

[Abstract] A literature survey is presented of the considerations entering into calculation of electrolyte diffusion constants in the polymer-water-electrolyte system. The mathematical arguments cover the adsorption/desorption approach, permeability methods based on determination of electrolyte flow through polymer films, effects of external mass transfer on electrolyte diffusion, kinetics of isotopic H→D exchange, and calculation of water diffusion coefficients since the kinetic plots for water and isotopic exchange coincide if the concentration of the label is on an order of magnitude lower than that of the water in the polymer. Figures 4; references 36: 25 Russian, 11 Western.
[64-12172]

UDC 678.06.033.019

SORPTION METHODS IN FLAW DETECTION OF POLYMERIC COMPOSITES

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 82 pp 42-44

GROMOV, A. N., MANIN, V. N. and KLENDO, Ye. M.

[Abstract] Several polymeric composites were evaluated for the effects of fillers on flaws, using an analytical approach based on adsorption methods and the theory of micropore filling. Calculations relying on maximum adsorption volume and adsorption energies derived from experimental adsorption isotherms indicated that fillers may either diminish microflaws (e.g., chloroprene rubber) or promote them (e.g., PEVD [sic]) in the polymeric composites. Figures 1; references 2 (Russian).
[64-12172]

UDC: 678.744.335-139(088.8)

SYNTHESIS OF POLYMETHYLMETHACRYLATE IMPACT STRENGTH MODIFIERS

Ivanovo IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA TEKHNOLOGIYA in Russian Vol 26, No 2, Feb 83
(manuscript received 25 May 81) pp 230-232

ZHIL'TSOV, S. F., MAZANOVA, L. M., SOKOLOVA, V. A. and SEMCHIKOV, Yu. D., Department of Chemistry, Gorkiy State Pedagogics Institute imeni M. Gor'kiy; Scientific Research Institute of Chemistry, Gorkiy State University imeni N. I. Lobachevskiy

[Abstract] The authors demonstrated the possibility of increasing the impact strength of polymethylmethacrylate by modifying it with methacrylate and methacrylate-butylacrylate, butylacrylate-styrene, butylacrylate-acrylonitrile copolymers in the following initiating systems: (iso-$C_3H_7)_2Hg$-$SnCl_4 \cdot 5H_2O$, (iso-$C_3H_7)_4Sn$-Sn-$Cl_4 \cdot 5H_2O$, $(CH_3)_3SiCl$-$NaB(C_6H_5)_4$. High impact strength PMMA was synthesized in a mass with a mass modifier content of 1.5 to 8.0% of the methylmethacrylate. The impact strength modifiers synthesized can increase the impact toughness of block PMMA specimens to $27 \cdot 10^3$ J/m^2 as opposed to $13 \cdot 10^3$ J/m^2 in unmodified specimens. References 3: 2 Russian, 1 Western.
[238-6508]

UDC: 541.64:539

SYNTHESIS OF 3,4,9,10-ALLYL-TRICYCLO-(4,2,2,$0^{2.5}$)-DEC-7-ENE-CARBOXYLATE

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA KHIMICHESKAYA in Russian No 2, Mar-Apr 83 (manuscript received 14 Jul 82) pp 48-51

ZHUBANOV, B. A., LYUBCHENKO, N. P. and SHVARTSMAN, V. Ye., Order of Labor Red Banner Institute of Chemical Sciences, Kazakh Academy of Sciences, Alma-Ata

[Abstract] A study is made of optimal conditions of synthesis of the compound mentioned in the title based on tricyclodecenetetracarboxylic acid dianhydride and allyl alcohol by esterification of an adduct of benzene with the allyl alcohol with continuous distillation of water as an aziotrope with benzene or m-xylene. The IR spectrum of the compounds is presented.. Sulfuric acid, p-toluene sulfoacid and KU-1 cationite were tested as catalysts of the reaction. The minimum content of allyl alcohol providing a high yield of the ester was 4.5 mols per mol of benzene adduct. The end product was produced with high quality and up to 90% yield with 0.16 moles p-toluene sulfoacid per mole of dianhydride, 0.08 mols of sulfuric acid per mol of dianhydride. Figures 3; references 3 (Russian).
[236-6508]

UDC: 541.64:547.538.141

INFLUENCE OF POLYBENZYLTHIOCYANATE AND BENZYLTHIOCYANATE-METHYLMETHACRYLATE COPOLYMER ON POLYMETHYLMETHACRYLATE DESTRUCTION

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA KHIMICHESKAYA in Russian No 2, Mar-Apr 83 (manuscript received 2 Sep 82) pp 51-54

KOLESNIKOVA, A. I., ZHUBOVA, B. A. and SMIRNOVA, T. Ya., Order of Labor Red Banner Institute of Chemical Sciences, Kazakh Academy of Sciences, Alma-Ata

[Abstract] A study is made of the influence of the method of distributing benzylthiocyanate in polymethylmethacrylate on its thermal stabilizing properties. In one case BTC was introduced to PMMA as an additive, chemically unbonded, in another copolymers of BTC with methylmethacrylate were used, in which the sulfide fragments are side groups of the polymer macromolecule. Comparison of the bond-breaking energy showed that the weakest is the C-S bond, with the C-C bond not much stronger. BTC which is chemically bonded with MMA can be used to inhibit the processes of high temperature oxidation. A mechanism of destruction inhibition is suggested. Figures 3; references 4: 3 Russian, 1 Western.
[236-6508]

UDC: 541.64:547.584

POLYMER SYNTHESIS BASED ON ORGANIC THIOCYANATES

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA KHIMICHESKAYA in Russian No 2, Mar-Apr 83 (manuscript received 2 Jun 82) pp 71-75

SMIRNOVA, T. Ya., and YERGAZIYEVA, K. I., Institute of Chemical Sciences, Kazakh Academy of Sciences, Alma-Ata

[Abstract] Thiocyanates and methylzinc acetanilide were obtained by standard methods. Polymerization was performed in ampules evacuated to 10^{-2} mmHg. The polymers were reprecipitated from dimethylformamide in methanol or extracted with methanol. Polybenzylthiocyanate was dissolved in acetone and reprecipitated in methanol. The possibility was demonstrated of synthesizing aliphatic and aromatic thiocyanate-based polymers. It was shown that the introduction of electronegative groups to the monomer molecule in the p position with respect to the thiocyanate group significantly increases its activity in the polymerization reaction. Figures 3; references 10: 1 Russian, 9 Western.
[236-6508]

UDC 541.4

STRUCTURE OF POLYETHYLENE SURFACE LAYER IN POLYMERIZATION-FILLED PEARLITE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 1, Mar 83
(manuscript received 19 Jul 82) pp 140-143

YENIKOLOPYAN, N. S., academician, PSHECHENKOV, P. A. and GRIGOROV, L. N., Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] A study of the connection between the kinetics of growth of the thickness of the polymer "tooth" and its structure and uniformity of distribution along the filler surface--exemplified by composition material consisting of particles of swollen, polymerization-filled pearlite--showed, at the first stage, independent and approximately uniform growth of polymer molecules at each center and, upon attainment of certain sizes, dense linking to one another, forming a primary coating of the surface without a clearly pronounced supermolecular structure and with approximately uniform thickness. At high degrees of filling, new layers of polymer are formed on the catalyst, with peeling of the primary layers and separation of them from the filler surface. Therefore different layers of the polymer coating will have different degrees of adhesion to one another and to the filler surface. Figures 4; references 2.
[220-2791]

UDC 678.675.541.64

INVESTIGATION OF MECHANISM CHARACTERISTICS OF CARBOXYLIC ACID CATALYSIS OF HIGH TEMPERATURE POLYAMIDATION OF MODEL COMPOUNDS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 268, No 5, Feb 83
(manuscript received 17 Aug 82) pp 1142-1146

ZHUBANOV, B. A., academician of KaSSR Academy of Sciences, BOYKO, G. I., MUKHAMEDOVA, R. F. and SOLOMIN, V. A., Institute of Chemical Sciences, KaSSR Academy of Sciences, Alma-Ata

[Abstract] Methods of cryometric titration, IR and NMR spectroscopy and microcalorimetry were used in studying catalytic effect of carboxylic acids in a single stage synthesis of polyimides based on alicyclic dianhydrides. Because these compounds are insoluble in cryometric solvents, studies were performed on model compounds: the anhydride component was represented by tetrahydrophthalic and maleic anhydrides, and the amine - by aniline and p-toluidine. Formation of binary complexes was noted in naphthalene and dioxane between the following pairs: benzoic acid and phenol, aniline and benzoic acid and aniline and phenol. A ternary complex formed from aminebenzoic acid-phenol which accelerated the amidation reaction. The

following reaction sequence was proposed: $C_6H_5COOH + C_6H_5OH \rightarrow C_6H_5COOH....O-C_6H_5$ (H, R-N-H, H) The catalytic effect of benzoic acid consists of accelerating the chain growth during polycondensation through activation of terminal amino groups at the time of the formation of ternary complexes. Figures 4; references 4 (Russian). [229-7813]

UDC: 541.64:547.538:678.046.3

INFLUENCE OF AEROSIL ON POLYMERIZATION OF STYRENE IN MASS

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 3, Mar 83 (manuscript received 30 Oct 81) pp 308-312

TSVETKOV, N. S., KOVAL'SKIY, Ya. P. and PANKEVICH, R. V., Lvov State University

[Abstract] A study is presented of the influence of aerosil, a highly-dispersed filler, on polymerization of styrene under the influence of polymer sebacic acid peroxide, benzoy peroxide and other peroxides. A slowing of polymerization is observed in the presence of aerosil, apparently related to a decrease in the effectiveness of the initiators. The influence of the aerosil on peroxide decomposition kinetics in the polymerization mixture was studied. The experiments showed that aerosil accelerates the destruction of polymer sebacic acid peroxide but does not influence the thermal decomposition of benzoyl peroxide. Thus, the indifference of aerosil to polymerization reactions under the influence of benzoylperoxide results primarily from the fact that it does not influence thermolysis of the radical polymerization initiator. The decrease in polymerization rate results from accelerated consumption of peroxide during the course of the process due to the heterolysis reaction and from the decrease in effectiveness of initiation of polymerization upon radical decomposition of peroxide. It is concluded that in polymerization of a nonpolar monomer the effect of aerosil on monomer conversion results basically from the nature of the initiator used. In the case of diacylperoxides the degree of this effect depends on the capability of peroxide molecules for interaction with acid groups on the surface of the mineral filler. Figures 3; references 8: 6 Russian, 2 Western. [235-6508]

UDC: 66.095.25:678.043.3

SPECIFICS OF STYRENE POLYMERIZATION IN PRESENCE OF FILLER

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 3, Mar 83 (manuscript received 2 Mar 82) pp 312-314

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[Abstract] The task of this study was to establish certain kinetic patterns in polymerization of styrene with maximum mineral filler content and initiator adsorbed on the surface of the filler. The mineral filler used was river sand treated with a boiling mixture of mineral acids then washed to neutral reaction with water, dried and ground to less than 0.25 mm particle size then heated at 550°C, $1.336 \cdot 10^{-3}$ gPa for 3 hours. The observed low polymerization rates of styrene in the presence of sand may result from an increase in the chain-breaking rate on the surface of the filler, low initiator decomposition constants or shielding of active centers. The low reaction rate results from the increased contribution of breaking of chains on primary radicals and the decreased effectiveness of initiation due to an increase in the reaction of primary recombination of radicals fixed on the solid surface. Figures 3; references 10 (Russian). [235-6508]

UDC: 541.127:668.474:678.744:678-13

KINETIC STUDIES OF GRAFT POLYMERIZATION OF METHYLACRYLATE TO NITROLIGNIN AND SUNYL

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 3, Mar 83 (manuscript received 15 Apr 82) pp 320-325

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[Abstract] The kinetic parameters of graft polymerization of methylacrylate to nitrolignin and sunyl [a hydrolyzed lignin derivative] are determined. The emulsifier used was introduced at a concentration too low to assure a homogeneous mechanism of particle formation. The inert gas used was nitrogen. A suggested reaction is presented for graft polymerization of methylacrylate to water-soluble hydrolyzed lignin derivatives. The mechanism includes decomposition of the initiator, initiation of homopolymerization, attack of the initial polymer, chain growth, reinitiation, quadratic chain breaking and linear chain breaking. An equation is presented for the monomer consumption rate. The reaction order for the monomer and initial polymer depends on the relationship between their concentrations and the reaction rates. References 16: 14 Russian, 2 Western. [235-6508]

UDC: 539.27

ELECTRONOGRAPHIC STUDY OF URANIUM TETRAFLUORIDE MOLECULAR STRUCTURE

Novosibirsk ZHURNAL STRUKTURNOY KHIMII in Russian Vol 24, No 1, Jan-Feb 83 (manuscript received 29 Jul 81) pp 70-74

GIRICHEV, G. V., PETROV, V. M., GIRICHEVA, N. I., ZASORIN, Ye. Z., KRASNOV, K. S. and KISELEV, Yu. M., Ivanovo Chemical Technology Institute; Ivanovo State University

[Abstract] Results are presented from a study of the structure of the UF_4 molecule using improved methods for production and processing of electronograms. The electronogram was assumed to consist of a super-imposition of the diffraction pictures from scattering of electrons on molecules in different electron states. Calculated and experimental values of l(U-F) agree well. Analysis of the experimental data shows that the tetrahedral model of the structure of UF_4 is inferior to a model with symmetry C_{3v} and D_{3d}. Present day techniques can make the selection between these two models as well. The solution of the problem of the configuration of the UF_4 molecule will essentially depend on the results of precision spectral studies. Figures 3; references 13: 4 Russian, 9 Western.
[230-6508]

UDC: 661.715.352.4.004.8:667.621.64

CONVERSION OF DIVINYL RUBBER PRODUCTION WASTES TO FILM-FORMING SUBSTANCE

Ivanovo IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA TEKHNOLOGIYA in Russian Vol 26, No 2, Feb 83
(manuscript received 6 Apr 81) pp 239-242

KUTYANIN, G. I., MIKHAYLOVSKAYA, I. D., BUTENKO, T. R. and ZAL'TSBERG, A. S., Department of Organic Chemistry, Voronezh Institute of Technology; Correspondence Institute of Soviet Trade

[Abstract] An attempt is made to confirm the nature of reactions occurring in the process of synthesis of a film-forming substance from unconditioned SKD and SKS-30ARKPN raw rubber in a solution consisting of heavy hydrocarbon still residue from fractional distillation of divinyl. The reaction producing the film-forming base was studied by NMR and IR spectroscopy. Analysis of the results produced indicate that changes in the NMR spectra of the products studied are related to breaking of double bonds and the formation of a new high molecular weight compound in the process of polymerization. Thermal oxidation of the solution of raw rubber in heavy hydrocarbons causes destruction to predominate over structure formation during the first three hours of the process. Figures 4; references 5 (Russian).
[238-6508]

UDC: 541.18.048

FLOCCULATION OF NATURAL RUBBER LATEX BY DIETHYLAMINOETHYLMETHACRYLATE-BASED COPOLYMERS

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 3, Mar 83 (manuscript received 21 Apr 82) pp 315-319

TESLENKO, A. Ya., BARAN, A. A., KURILENKO, O. D., deceased, and SOLOMENTSEVA, I. M., Institute of Colloid Chemistry and Water Chemistry imeni A. V. Dumanskiy, Ukrainian Academy of Sciences

[Abstract] A study is made of the regularity of flocculation of natural rubber latex by a new class of synthesized cation-active polymers and the flocculating effect of these polyelectrolytes is compared with that of domestic and foreign commercial specimens. The natural rubber latex used had particle size 200 to 500 nm, electrokinetic potential of particles 50 mV. This latex can be used as a colloid chemical model of a biological dispersion of E. coli. The flocculants used were flexible chain polyelectrolytes, diethylaminoethylmethacrylate and dimethylaminoethylmethacrylate homopolymers, as well as their copolymers with acrylamide, acrylic acid and vinylpyrrolidone. There is some correlation between the flocculating effect of the polymers in water and in mineral nutrient media. The most effective flocculant in water and in the mineral nutrient media is the diethylaminoethylmethacrylate polymer. The highest molecular weight specimens have a stronger aggregating effect on the latex than specimens with similar charge but lower molecular mass. The flocculation mechanism of the system is apparently complex, being determined by the decrease in electrostatic repulsion between particles upon adsorption of oppositely charged macroions as well as the formation of polymer bridges between particles. Figure 1; references 13: 11 Russian, 2 Western.
[235-6508]

UDC: 541.64:536

COMPATIBILITY OF EPOXY OLIGOMER BASED ON DIGLYCIDYL RESORCINOL ESTER WITH OLIGOMER RUBBERS OF VARIED POLARITY

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 3, Mar 83 (manuscript received 23 Apr 82) pp 325-328

VYSOTSKAYA, G. V., VSELOVSKIY, R. A., KOCHERGIN, Yu. S., ZAYTSEV, Yu. S., and MAKOVETSKAYA, T. L., Institute of High-Molecular-Weight Compound Chemistry, Ukrainian Academy of Sciences

[Abstract] A study is made of the thermodynamic compatibility of an epoxy oligomer based on diglycidyl resorcinol ester with low molecular rubbers of varyed polarity and the influence of rubber polarity on compatibility with bis-imidazoline sebacic acid used as a cross linking agent for the

epoxy resin. The studies were performed by the method of inverted gas chromatography. The diglycidyl resorcinol used was industrial type UP-637 oligomer with molecular mass 220, epoxy number 33.4. The oligomer rubbers were liquid polybutadiene rubbers with terminal carboxylic groups with molecular mass 2800-3200, carboxylic group content 2.8%. Analysis of the concentration dependence of the reaction showed that the nature of the rubber significantly influences its combination with the epoxy oligomer. Increasing rubber polarity expands the area of homogeneous mixing. The extreme changes of adhesion indices for the epoxy polymer modified with liquid carboxylate rubbers with varying acrylonitrile contents are determined largely by the thermodynamic compatibility of the system components which depends on the temperature, composition and polarity of the rubber. Figures 3; references 11: 6 Russian, 5 Western.
[235-6508]

UDC: 678.762.3-9

STUDY OF MOLECULAR COMPOSITION OF RAW RUBBER-OLIGOMER COMPOUND CONTAINING NITROSOAMINE GROUPS

Moscow KAUCHUK I REZINA in Russian No 3, Mar 83
(manuscript received 2 Feb 82) pp 3-5

VALUYEV, V. I., KOGAN, L. M., LEMESHEVA, T. A. and MONASTYRSKAYA, N. B., All-Union Scientific Research Institute of Rubber imeni S. V. Lebedev

[Abstract] A study is made of the molecular parameters of cis-1, 4-oligoisoprene SKI-3-NA and the polymer-oligomer composition SKI-3-OK. The oligomer was produced by deep destruction of SKI-3 upon interaction with 15 to 17% p-nitrosodiphenylamine (PNDFA) at 70°C. It was found that as the molecular mass of the oligomer fractions increased, the content of PNDFA decreased, while their funtionality increased. Specimens of SKI-3-NA obtained in various solvents differed in the width of the molecular mass distribution. The distribution of PNDFA in the rubber-oligomer composition SKI-3-OK was determined by fractionation of the polymer with multistage column extraction and subsequent determination of the characteristic viscosity of the fractions and concentration of bound PNDFA. The results indicate that there is a clear separation of polyisoprene and oligoisoprene with nitrosoamine groups. The polymer-oligomer composition SKI-3-OK is a two component system in which there is no chemical interaction between the nitrosoamine groups of the oligomer and the high molecular weight cis-1, 4-polyisoprene. Figures 4; references 8: 7 Russian, 1 Western.
[217-6508]

UDC: [678.063.678.046.2]:678.046

INFLUENCE OF CERTAIN ADDITIVES ON VULCANIZATION GRID STRUCTURE OF FILLED SKI-3 BASED RUBBERS

Moscow KAUCHUK I REZINA in Russian No 3, Mar 83
(manuscript received 18 Dec 81) pp 7-9

YUZHAKOVA, N. A., ANFIMOVA, E. A., LYKIN, A. S. and SHUMANOV, L. A., Scientific Research Institute of the Tire Industry

[Abstract] A study is made of the influence of certain substances, which change the adsorption activity of the surface of technical carbon, on the structural parameters of the vulcanization grid of filled SKI-3-based rubbers. The additives tested included the secondary accelerator ε-caprolactam and disproportionated colophony with plasticizing properties. A comparison of the acetone extract of vulcanizates showed that colophony is practically completely extracted from unfilled rubbers, ε-caprolactam is 60% extracted, the figures being 90% and 30% for filled rubbers. Unfilled vulcanizates with ε-caprolactam have the densest grid. In all filled vulcanizates the concentration of cross links in the matrix is less than in unfilled vulcanizates of the same composition. Introduction of the additives decreases the difference in grid density. This influence is apparently explained by interaction of the additives with the surface of the technical carbon. It is established that introduction of additives changing the activity of the filler surface increases the effectiveness of the use of vulcanizing agents for cross linking of the rubber phase. Figures 4; references 8: 6 Russian, 2 Western.
[217-6508]

UDC: 678.049.37:678.745.32

STUDY OF KINETICS OF RUBBER SWELLING IN LIQUID MEDIA

Moscow KAUCHUK I REZINA in Russian No 3, Mar 83
(manuscript received 18 Dec 81) pp 9-11

POSTOVSKAYA, T. S., Scientific Research Institute of the Rubber Industry

[Abstract] A study was made of the kinetics of swelling of rubbers in various media to determine the maximum degree of swelling by a more rapid calculation method. To determine the maximum degree of swelling by a calculation method, the object of investigation was rubber based on oil and gasoline resistant butadiene-nitrile type SKN-26 raw rubber, SKN-18 rubber and a combination of SKN-18 + nairite. The swelling media consisted of an aqueous solution of glycerine and glycol with anticorrosion, antifriction and antifoaming additives plus MS-8P petroleum oil. The graph-analytic method of calculation suggested for determining the maximum degree of swelling of the specimen based on the initial section of the kinetic curve

can significantly reduce the testing time of specimens, almost by a factor of 4. References 4 (Russian).
[217-6508]

UDC: 678.763.2.063:678.029.43

MECHANISM OF CHEMICAL WELDING OF CHLOROPRENE RUBBER VULCANIZATES

Moscow KAUCHUK I REZINA in Russian No 3, Mar 83
(manuscript received 25 Dec 81) pp 13-14

KOMAROV, G. V., Moscow Aviation Technology Institute imeni K. E. Tsiolkovskiy

[Abstract] A study was made of the influence of type of processing on joint quality produced by chemical welding of chloroprene rubber, in which chemical bonds are formed as a result of secondary reactions. The method of mathematical experimental planning with selection of the welded joint strength as the optimization parameter was used to establish the following optimal conditions of chemical welding without additives: temperature 200±5°C, pressure on surface 2.5±0.5 MPa, bonding time 3 minutes. The surface relief before welding and after heating were analyzed to confirm plastic flow of the material in the zone of contact between the surfaces. The data obtained agree well with the results of determination of the thermomechanical properties of the rubber. There is a sharp increase in compression deformation beginning at 190-200°C. Heating to 100-150°C has practically no influence on the tearing strength of the rubber. Further increases in temperature or length of heat treatment cause additional vulcanization of the rubber. Figures 2; references 8 (Russian).
[271-6508]

UDC: 678.84.074:66.081.001.5

EFFECTIVENESS OF THERMAL STABILIZERS IN SILOXANE-BASED RUBBERS

Moscow KAUCHUK I REZINA in Russian No 3, Mar 83
(manuscript received 7 Jul 81) pp 15-20

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[Abstract] A study is made of the relative influence of the inhibiting capacity of stabilizers and the chemical structure of vulcanizates on the stability of the properties of rubbers. Studies involving aging in air were performed with greatly differing products and aging conditions. The quantity of peroxide used to vulcanize SKTV rubber (1 mass part per 100 mass parts rubber) was approximately 5 times the dose necessary to

achieve the maximum degree of cross linking. SKTV-based rubber containing various thermal stabilizers has practically constant spatial grid density and primary physical and mechanical properties. The main factor determining the duration of retention of elastic properties of rubber of one composition with various thermal stabilizers under intensive oxidation conditions is the delaying effect of the stabilizers on oxidation of rubber. Under slow oxidation conditions the difference in the influence of stabilizers on the duration of retention of elasticity depends basically on the effect of the stabilizers on the initial density of the grid. The difference in rate of accumulation in rubbers with various thermal stabilizers is determined not only by the influence of the stabilizers on vulcanization grid density, but also on the process of oxidation. To produce rubber with greater resistance to thermal aging in the free and stressed states with high air temperatures it is desirable to use stabilizers having the maximum inhibiting activity but not decreasing the effectiveness of vulcanization. Figures 4; references 8 (Russian).
[217-6508]

UDC: 661.666.4:537.311

FACTORS DETERMINING ELECTRIC CONDUCTIVITY PROPERTIES OF TECHNICAL CARBON

Moscow KAUCHUK I REZINA in Russian No 3, Mar 83
(manuscript received 18 Dec 81) pp 20-22

NIKITIN, Yu. N., KORNEV, A. Ye. and USTINOV, V. V., Scientific Research and Planning-Technology Institute of the Tire Industry; Moscow Order of Labor Red Banner Institute of Precision Chemical Technology imeni M. V. Lomonosov

[Abstract] A study was made of the connection between the porosity of technical carbon and the degree of ordering of the material of dispersed units, as well as the influence of ordering on the electrical conducting properties of technical carbon. The objects of the study were specimens of conductive furnace technical carbon type PME-80V and PME-100V, as well as series-produced fillers types PM-105, PM-75, PM-50 and PM-15. Ordering of the material was studied by gasification. Specimens of the initial technical PME-100V and PM-105 carbon and products of their gasification were tested in a standard rubber mixture. The data confirmed the assumption that microporosity has practically no direct influence on electric conducting properties of technical carbon. The improvement in conducting properties of technical carbon can be achieved by increasing its surface smoothness, the order of the material of the dispersed units and the degree of substitution of surface functional groups by hydrogen. Figures 2; references 10: 5 Russian, 5 Western.
[217-6508]

UDC: 678.4.06:62-762.444:620.179.4

INFLUENCE OF ADHESION INTERACTION OF RUBBER WITH METAL ON OPERATION OF SEALS IN AIR AT HIGH PRESSURE

Moscow KAUCHUK I REZINA in Russian No 3, Mar 83
(manuscript received 29 Oct 81) pp 29-30

SACHKO, A. A., SAVOYSKIY, V. N., KUZ'MINSKIY, A. S. and VASIL'YEV, N. V.,
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[Abstract] A study is made of the adhesion interaction of rubber with metal under conditions of long-term holding of rubber seals in a gas medium at elevated pressure. The objects of the study were rings made of SKMS-10 rubber and combined (SKEP+SKMS-10) rubber. Tests were performed in air at 3 and 23 MPa and at atmospheric pressure or under a vacuum, 0.1 mPa at 70 to 90°C. It was found that adhesion interaction between rubber and metal may cause a leveling of the influence of vacuum in comparison to air at atmospheric pressure on the operation of rubber seals. The possible adhesion effect between rubber and metal must be considered in comparing the functioning of seals at various pressures. Figures 2; references 9 (Russian). [217-6508]

UDC: 662.74.013.8:628.543.563:546.214

INTENSIFICATION OF BIOLOGICAL PURIFICATION OF COKE CHEMICAL ENTERPRISE WASTE WATER WITH OZONE

Moscow KOKS I KHIMIYA in Russian No 4, Apr 83 pp 49-50

SOKRATOVA, N. B., FUNTIKOVA, N. S., KLIMOVA, V. T. and STARODUBTSEV, D. S., Moscow Institute of Steels and Alloys

[Abstract] Studies were performed at the Moscow Coke Gas Plant and Novolipetsk Metallurgical Plant using a culture of the yeast Candida tropicalis SD5 which can grow well at high phenol concentrations (up to 0.2%). The process was studied in a commercial fermenter at 301K, pH 6.8, air feed rate 8 ml/s. A charge of 0.1 to 0.3 g/l of the culture was introduced. The phenol concentration was measured with a spectrophotometer, the growth of the culture determined nephelometrically by a photocolorimeter with green light filter. Waste water was purified both with and without preliminary processing of the water with an ozine-air mixture for 300, 600 and 900 s. The results of the experiments on decomposition of phenol in the aqueous solution by Candida tropicalis indicated that preliminary treatment of the waste water with ozone causes phenol consumption and yeast growth to be completed 16 to 20 hours more quickly than in the control experiment, the residual phenol concentration being 350 times less in the experiment with ozone treatment than in the control without preliminary ozonation. Figure 1; references 4: 1 Russian, 1 Western, 2 Japanese.
[233-6508]

UDC: 628.35.65.011.56

AUTOMATIC CONTROL OF BIOLOGICAL WASTE WATER PURIFICATION

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 3, Mar 83 pp 17-19

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[Abstract] The load on waste water treatment plants varies widely through the day and through the year. The necessary water purification quality is achieved primarily by construction of excess capacity, which is wasteful. This article studies the process of biological waste water purification as an object of automatic control. In the first stage the operation of the structures was studied under steady conditions. The controlled object was then shifted out of the steady operating area by a sudden change in one or two input or control parameters and the change in state parameters with time was determined: concentration of contaminants, of active silt, dissolved oxygen, change in rate of oxygen consumption at various points through the operating volume or at the output of the structure. The primary tasks and methods of control are defined and methods are developed for analysis and synthesis; the structure and design of individual system units of an automatic controller are determined, based on automation instruments and equipment series produced in the Soviet Union.
[234-6508]

UDC: 541.18:628.3

DESORPTION OF ARSENIC DURING PURIFICATION OF ARSENIC-CONTAINING WASTE WATER

Ivanovo IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA TEKHNOLOGIYA in Russian Vol 26, No 2, Feb 83 (manuscript received 25 Mar 81) pp 210-213

VLASOVA, V. I. and PETRYAYEV, Ye. P., Department of Radiation Chemistry and Chemical Technology, Belorussian State University imeni V. I. Lenin

[Abstract] The purpose of this work was to develop an ion exchange method of purifying condensate for reutilization of alkaline arsenic solutions and purified water in production. Sorption of As(III) from the condensate of several commercial ion exchange resins was tested. Sorption of As(III) from waste water following cation exchange processing and containing up to 120 mg/l carbonic acid on highly basic anionites was studied. This work was intended to determine the optimal conditions of arsenic desorption by potassium hydroxide solutions to produce an alkaline arsenic solution in

which the K_2O:As_2O_3 ratio was 2:1 as required by the technology, suitable for recycling. It was found that desorption changes greatly as a function of CO_3 anion content. Desorption of arsenic under optimal conditions occurs when 1-2% KOH solution is used with a specific load of 5-7 hr^{-1} and a content in the water after processing with the cationite of 20 to 30 mg/l carbonic acid. References 5 (Russian).
[238-6508]

CSO: 1841 - END -